COMPAQ

# ProLiant ML330

Maintenance and Service Guide

Second Edition (May 2000)
Part Number 174623-002
Spare Part Number 176670-001
Compaq Computer Corporation

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# Contents


**About This Guide**

Symbols in Text ..... vii
Compaq Tecbnician Notes ..... viii
Where to Go for Additional Help ..... ix
Integrated Management Log ..... ix
Telephone Numbers ..... ix

*Chapter 1*

**Illustrated Parts Catalog**

Mechanical Parts Exploded View ..... 1-2
Mechanical Spare Parts List ..... 1-3
System Components Exploded View ..... 1-4
System Components Spare Parts List ..... 1-5

*Chapter 2*

**Removal and Replacement Procedures**

Electrostatic Discharge Information ..... 2-2
Symbols on Equipment ..... 2-3
Preparation Procedures ..... 2-4
Server Warnings and Precautions ..... 2-4
Front Bezel ..... 2-5
Access Panel ..... 2-6
Storage Devices ..... 2-7
Bezel Blanks ..... 2-8
Drive Tray ..... 2-9
Hard Drive Compartment ..... 2-10
Hard Drives ..... 2-12
Power Switch ..... 2-13
Fan ..... 2-15
Cable Routing Diagrams ..... 2-16
Processor with Heatsink ..... 2-18
Memory Modules ..... 2-20
Removing a Memory Module ..... 2-21
Expansion Slots ..... 2-22
Server Feature Board ..... 2-23
Expansion Board Guide ..... 2-24
System Board ..... 2-25
Power Supply ..... 2-26


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## Removal and Replacement Procedures

*continued*

Replacing a Battery ..... 2-27
Replacing the System Board Battery ..... 2-27
Replacing the Server Feature Board Battery ..... 2-29

# Chapter 3

## Diagnostics and Troubleshooting

Diagnostic Tools Overview ..... 3-2
Default Configuration ..... 3-3
Utilities Access ..... 3-4
Running Compaq Utilities ..... 3-4
POST Error Messages ..... 3-5
Diagnostics Software ..... 3-33
Steps for Diagnostics ..... 3-33
100 – 199, Primary Processor Test Error Codes ..... 3-34
200 – 299, Memory Test Error Codes ..... 3-35
300 – 399, Keyboard Test Error Codes ..... 3-36
400 – 499, Parallel Printer Test Error Codes ..... 3-36
500 – 599, Video Display Unit Test Error Codes ..... 3-37
600 – 699, Diskette Drive Test Error Codes ..... 3-38
800 – 899, Video Board Test Error Codes ..... 3-39
1100 – 1199, Serial Test Error Codes ..... 3-39
1200 – 1299, Modem Communications Test Error Codes ..... 3-40
1700 – 1799, Hard Drive Test Error Codes ..... 3-41
1900 – 1999, Tape Drive Test Error Codes ..... 3-42
2400 – 2499, Advanced VGA Board Test Error Codes ..... 3-42
6500 – 6599, SCSI Hard Drive Test Error Codes ..... 3-44
6600 – 6699, SCSI/IDE CD-ROM Drive Test Error Codes ..... 3-44
6700 – 6799, SCSI Tape Drive Test Error Codes ..... 3-45
8600 – 8699, Pointing Device Interface Test Error Codes ..... 3-45
Array Diagnostic Utility (ADU) ..... 3-46
Starting ADU ..... 3-46
ADU Diagnostic Messages ..... 3-47
Integrated Management Log (IML) ..... 3-57
Multiple Ways of Viewing the IML ..... 3-57
Event List ..... 3-59
Event Messages ..... 3-59
Rapid Error Recovery ..... 3-61
Automatic Server Recovery (ASR) ..... 3-62
ASR Integrated Management Log (IML) Messages ..... 3-64
Storage Fault Recovery Tracking ..... 3-66
Storage Automatic Reconstruction ..... 3-66
Network Interface Fault Recovery Tracking ..... 3-66
Memory Fault Recovery Tracking ..... 3-66
ROMPaq Error Recovery Options ..... 3-66
ROMPaq Disaster Recovery ..... 3-67
Compaq Insight Manager ..... 3-68
Compaq Insight Management Software Features ..... 3-68
Compaq Insight Management Software Architecture ..... 3-69

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## Chapter 4
### Connectors, Switches, and LED Indicators

Connectors....4-1
System Board Components....4-2
Rear Panel Connectors....4-3
Server Feature Board Components....4-4
Switches....4-5
Processor Speed Switch Settings (SW1)....4-5
System Configuration Switch Settings (SW2)....4-6
Server Feature Board Configuration Switch Settings (SW1)....4-7
Voltage Regulator Switch....4-8
Status Indicators....4-9
System Status LED Indicators....4-9
Network Controller Status Indicators....4-10

## Chapter 5
### Physical and Operating Specifications

System Unit....5-2
Memory....5-3
1.44-MB Diskette Drive....5-3
IDE CD-ROM Drive....5-4
Wide Ultra2 SCSI Hard Drives....5-5
Integrated 10/100 Wake on LAN Network Interface Controller (NIC)....5-6
Integrated Single Channel Wide Ultra2 SCSI Controller....5-6

## Index

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# About This Guide

This maintenance and service guide is a troubleshooting guide that can be used for reference when servicing the Compaq ProLiant ML330.

**WARNING:** To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs could create conditions that are hazardous.

## Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

**WARNING:** Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

**CAUTION:** Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

**IMPORTANT:** Text set off in this manner presents clarifying information or specific instructions.

**NOTE:** Text set off in this manner presents commentary, sidelights, or interesting points of information.

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# Compaq Technician Notes

**WARNING:** Only authorized technicians trained by Compaq should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

**WARNING:** To reduce the risk of electric shock or damage to the equipment:

- The system has multiple power supplies; disconnect power from the system by unplugging all power cords from the power supplies.
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.

**CAUTION:** To properly ventilate the system, you must provide at least 7.6 cm (3 inches) of clearance at the front and back of the computer.

**CAUTION:** The computer is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

**NOTE:** Any indications of component replacement or printed wiring board modifications may void any warranty.

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# Where to Go for Additional Help

In addition to this guide, the following information sources are available:

- User documentation
- *Compaq Service Quick Reference Guide*
- Service training guides
- Compaq service advisories and bulletins
- Compaq QuickFind
- Compaq Insight Manager
- Compaq download facility: Call 281-518-1418

## Integrated Management Log

The ProLiant ML330 includes an integrated, nonvolatile management log that contains fault and management information. The contents of the Integrated Management Log (IML) can be viewed with Compaq Insigbt Manager or an IML Viewer for the supported operating system.

## Telephone Numbers

For the name of your nearest Compaq authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.

For Compaq technical support:

- In the United States and Canada, call 1-800-386-2172.
- For Compaq technical support phone numbers outside the United States and Canada, visit the Compaq website:

  http://www.compaq.com

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Chapter 1

# Illustrated Parts Catalog

This chapter provides the illustrated parts breakdown and spare parts lists for the Compaq ProLiant ML330 server with a Pentium III processor and a 133-MHz system bus. See Table 1-1 and Table 1-2 for the names of referenced spare parts.

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# Mechanical Parts Exploded View

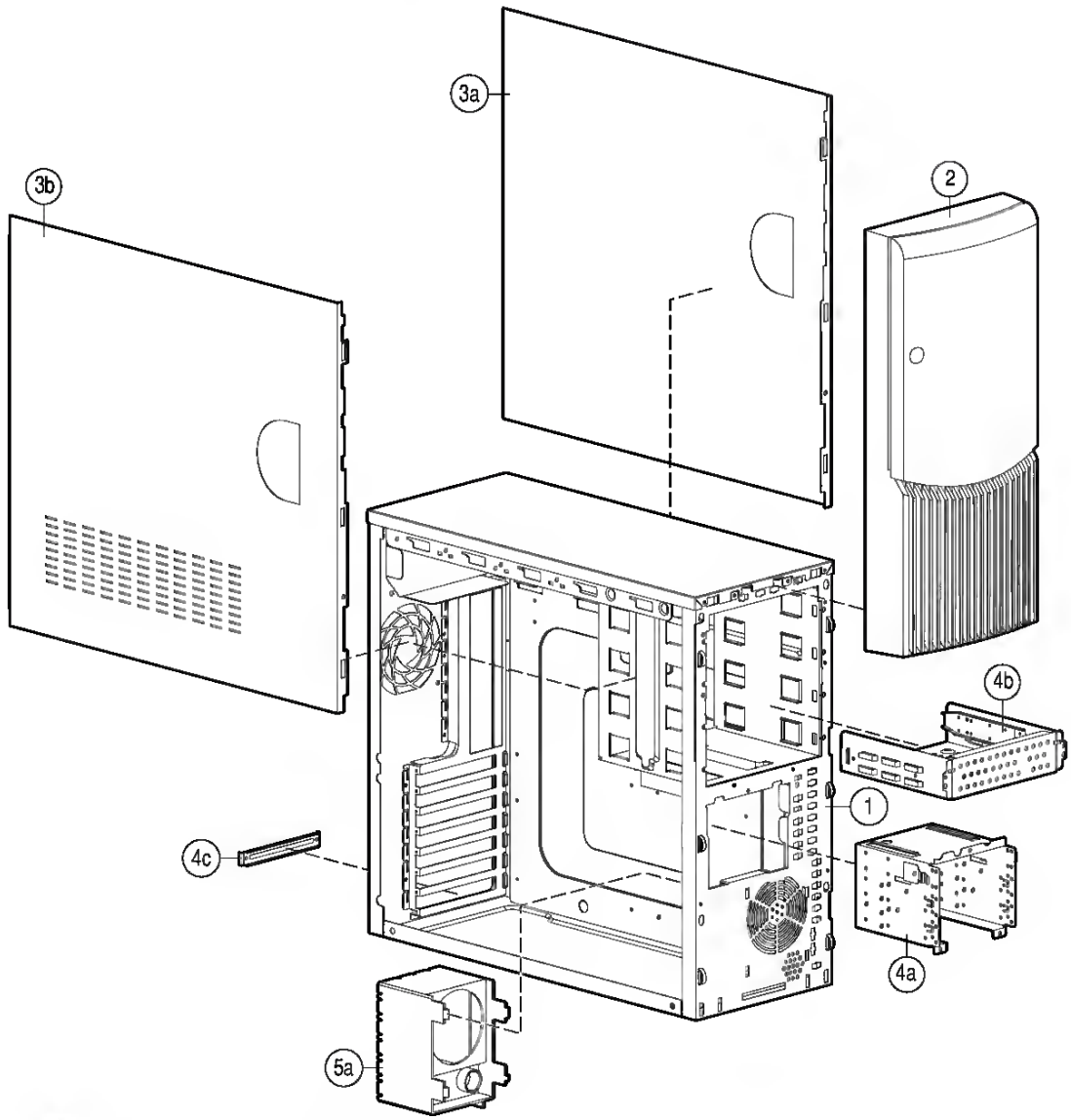


Figure 1-1. Mechanical parts exploded view

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# Mechanical Spare Parts List

**Table 1-1**
**Mechanical Spare Parts List**

| Item | Description | Spare Part Number |
|---|---|---|
| | **Chassis** | |
| 1 | Chassis assembly | 176605-001 |
| 2 | Front bezel | 176604-001 |
| 3 | Panel access left/right | 176606-001 |
| | a) Hood panel | |
| | b) Access panel | |
| | **Miscellaneous** | |
| 4 | Hardware kit | 176618-001 |
| | a) Hard drive compartment | |
| | b) Removable drive tray | |
| | c) Expansion board knockout | |
| 5 | Miscellaneous plastics kit | 176617-001 |
| | a) Expansion board guide | |
| | b) Rubber bumpers * | |
| | c) Removable media bezel blank * | |
| | d) Cable clips * | |
| | e) Miscellaneous clamps * | |

* Not shown

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# System Components Exploded View

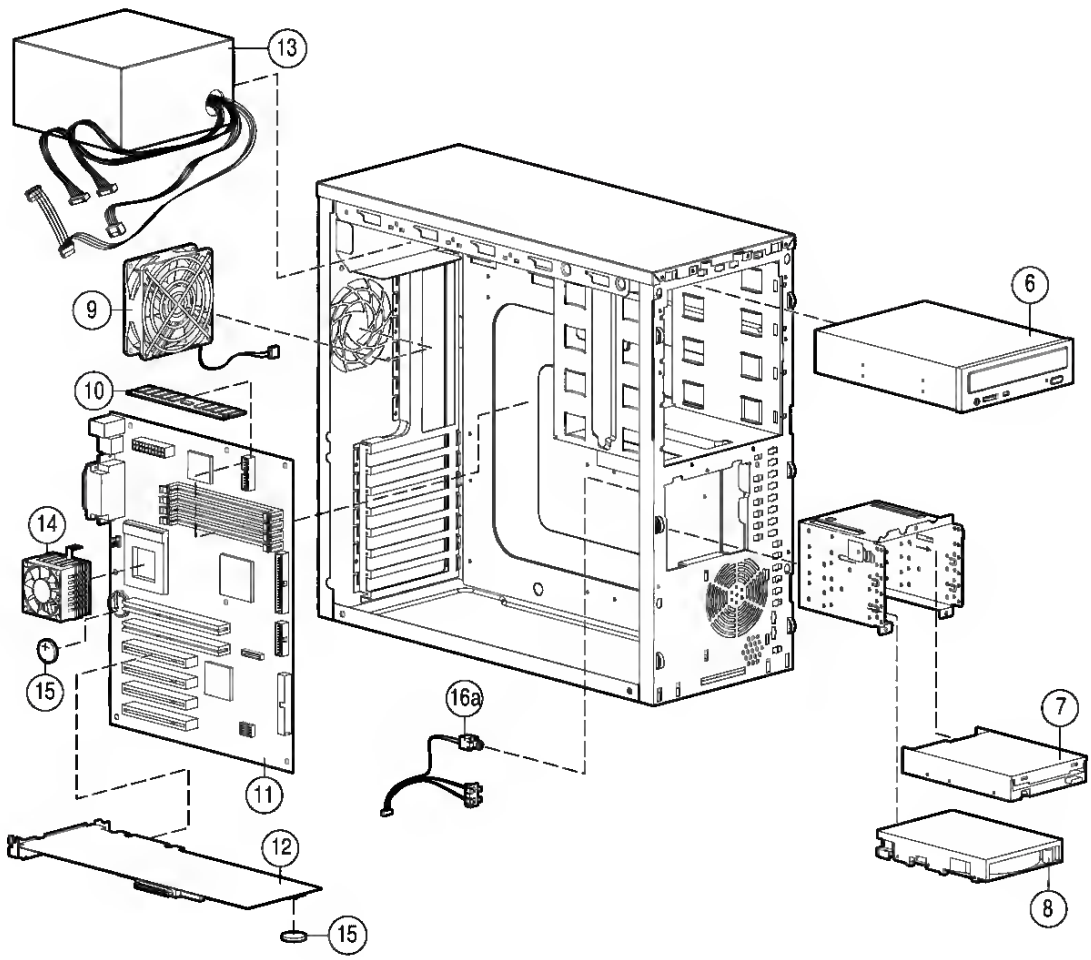


Figure 1-2. System components exploded view

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# System Components Spare Parts List

**Table 1-2**
**System Components Spare Parts List**

| Item | Description | Spare Part Number |
|---|---|---|
| | **Mass Storage Devices** | |
| 6 | CD-ROM drive | |
| | ■ 32X IDE CD-ROM drive | 163354-001 |
| | ■ 40X IDE CD-ROM drive * | 179963-001 |
| 7 | Diskette drive | 123958-001 |
| 8 | 9.1-GB Wide Ultra2 hard drive | 349534-001 |
| | **System Components** | |
| 9 | Fan | 176609-001 |
| 10 | PC 133-MHz ECC Registered SDRAM DIMM | |
| | a) 64-MB * | 159225-001 |
| | b) 128-MB * | 159226-001<br>164278-031 |
| | c) 256-MB * | 159304-001<br>159377-001 |
| | d) 512-MB * | 159227-001<br>177628-001 |
| | **Boards** | |
| 11 | System board | 176615-001 |
| 12 | Server Feature Board | 176608-001 |
| | **Power** | |
| 13 | 250W power supply | 176616-001 |
| 14 | Pentium III processor | |
| | a) 667/133 with heatsink * | 176610-001 |
| | b) 733/133 with heatsink * | 176612-001 |
| | c) 800/133 with heatsink * | 176613-001 |
| | d) 866/133 with heatsink * | 176614-001 |
| | e) 933/133 with heatsink * | 202350-001 |
| 15 | CR2032 lithium battery | 234556-001 |

* Not shown

*continued*

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**Table 1-2**
**System Components Spare Parts List** *continued*

| Item | Description | Spare Part Number |
|---|---|---|
| | **Power** *continued* | |
| 16 | Power cable kit | 176619-001 |
| | a) Power button assembly | |
| | b) Power shield cable * | |
| | c) Power extension cable * | |
| | **Miscellaneous** | |
| 17 | Enhanced keyboard * | 386209-001 |
| 18 | Signal cable kit * | 176620-001 |
| | a) IDE ribbon cable assembly | |
| | b) Diskette drive cable assembly | |
| | c) Server Management Information Cable (SMIC) connector assembly | |
| 19 | Ultra2 SCSI cable * | 176607-001 |
| 20 | Maintenance and service guide * | 176670-001 |
| 21 | Illustrated parts map * | 176671-001 |
| 22 | Country kit * | 178196-001 |
| 23 | Return kit * | 176621-001 |

* Not shown

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Chapter 2

# Removal and Replacement Procedures

This chapter provides subassembly/module-level removal and replacement procedures for the Compaq ProLiant ML330. Run the diagnostics program to verify that all components operate properly.

To service the ProLiant ML330, you might need the following:

- Torx T-15 screwdriver
- Phillips screwdriver
- From the Compaq SmartStart and Support Software CD:
  - Array Diagnostics Utility (ADU)
  - Diagnostics software

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# Electrostatic Discharge Information

A discharge of static electricity can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover workstations with approved static-dissipating material. Provide a wrist strap connected to the work surface, and properly grounded (earthed) tools and equipment.
- Keep work area free of nonconductive materials, such as ordinary plastic assembly aids and foam packing.
- Make sure you are always properly grounded (earthed) when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.
- Always place drives with the PCB assembly side down.
- Use conductive field service tools.

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## Symbols on Equipment

These icons may be located on equipment in areas where hazardous conditions may exist.

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

**WARNING:** To reduce risk of injury from a hot component, allow the surface to cool before touching it.

Any surface or area of the equipment marked with these symbols indicates the presence of electric shock hazards. Enclosed area contains no operator-serviceable parts.

**WARNING:** To reduce risk of injury from electric shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

**WARNING:** To reduce risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

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## Preparation Procedures

**WARNING:** Only authorized technicians trained by Compaq should attempt to repair this equipment. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

**CAUTION:** Electrostatic discharge can damage electronic components. Be sure you are properly grounded (earthed) before beginning any installation procedure. See "Electrostatic Discharge Information" earlier in this chapter for more information.

Before beginning any removal and replacement procedure:

1. Open the drive bay door on the front bezel.
2. Power down the ProLiant ML330 by pressing the power button on the front of the server.

**IMPORTANT:** To completely remove all power from the ProLiant ML330, you must disconnect the power cord. The front panel power button may not completely shutdown power to the server.

3. Disconnect and remove the AC power cord from the AC outlet, and then from the ProLiant ML330.
4. Disconnect any other external equipment connections to the server.

## Server Warnings and Precautions

**WARNING:** To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching.

**CAUTION:** Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

**CAUTION:** The server must always be operated with system unit covers on. Proper cooling is not achieved when the system unit covers are removed.

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# Front Bezel

**CAUTION:** Before removing the front bezel, make sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded AC outlet.

To remove the front bezel:

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Pull forward on the latch ❶ at the bottom of the front bezel.
3. Swing the front bezel ❷ upward, and slide it out and away from the chassis.

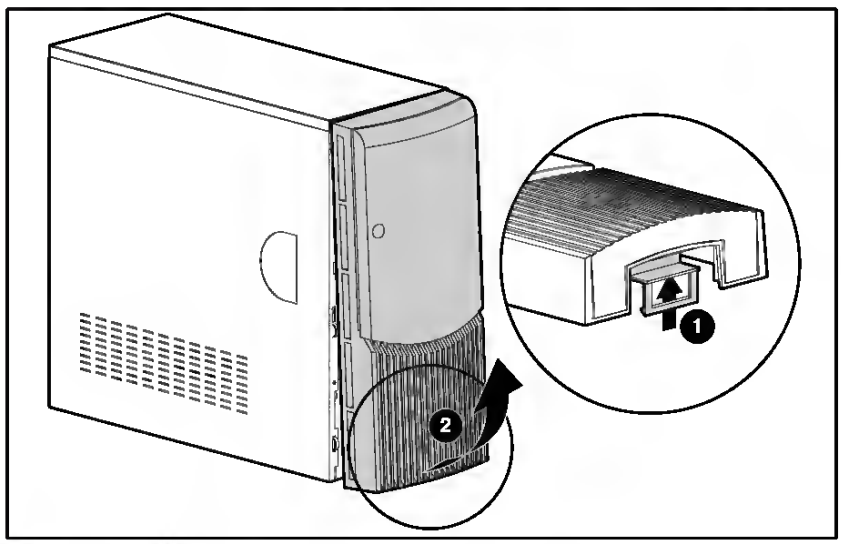


Figure 2-1. Removing the front bezel

**NOTE:** When replacing the front bezel, ensure that the top hinge points are properly placed in the chassis before rotating the front bezel back into its original position.

**NOTE:** As a security measure, when the bezel is open, an intruder alert displays the message, "The bezel (front cover) is not installed. Please verify that system access was authorized." or "The bezel (front cover) was removed since last power up. Please verify that system access was authorized."

Reverse steps 1 through 3 to replace the front bezel.

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# Access Panel

**WARNING:** To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching.

**CAUTION:** Before removing the access panel, make sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet.

**CAUTION:** Do not operate the server with the large access panel removed. This panel is an integral part of the cooling system and removing it while the system is running may adversely affect data integrity.

To remove the access panel:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front bezel. See "Front Bezel" earlier in this chapter.
3. Remove the screw ❶ located on the left side of the front chassis.
4. Slide the access panel ❷ forward, pull from the top of the access panel, and then lift the panel from the chassis.

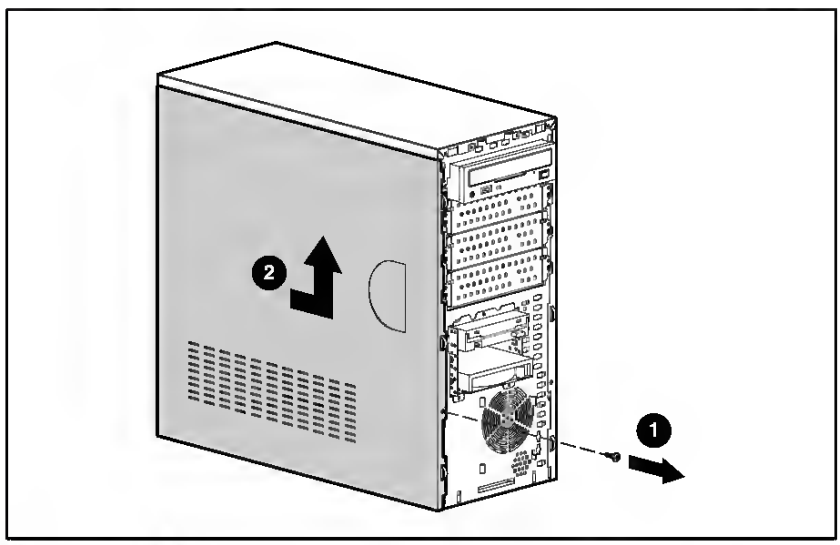


Figure 2-2. Removing the access panel.

**NOTE:** Turn the access panel over to locate the System Configuration Label. This label provides information about the system board on your ProLiant ML330.

Reverse steps 1 through 4 to replace the access panel.

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# Storage Devices

The ProLiant ML330 ships standard with seven drive bays, with five available. Figure 2-3 shows the location of the storage devices. Table 2-1 shows the corresponding drive bay descriptions.

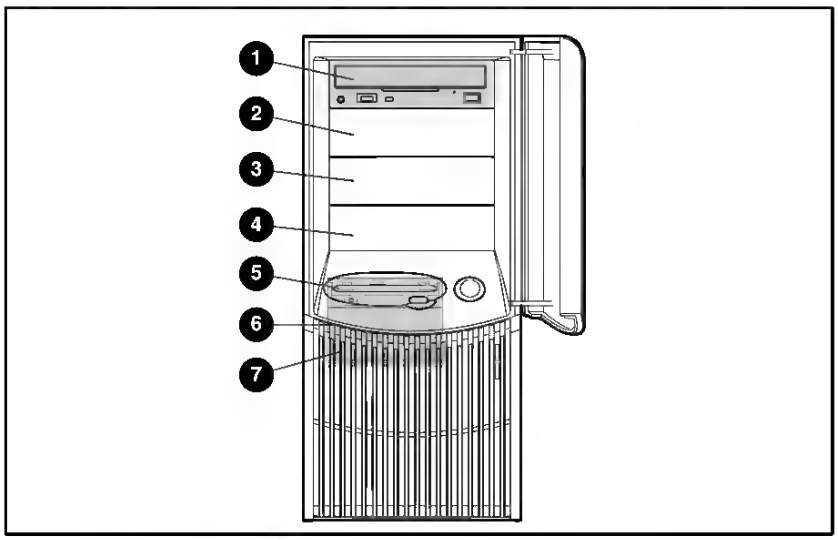


Figure 2-3. Storage device locations

**Table 2-1**
**Drive Bay Descriptions**

| Drive Position | Description |
|---|---|
| ❶ | 5.25 x 1.6 inch IDE CD-ROM drive bay |
| ❷ | 5.25 x 1.6 inch available removable media drive bay |
| ❸ | 5.25 x 1.6 inch available removable media drive bay |
| ❹ | 5.25 x 1.6 inch available removable media drive bay |
| ❺ | 3.5 x 1 inch 1.44-MB diskette drive bay |
| ❻ | 3.5 x 1 inch hard drive bay |
| ❼ | 3.5 x 1 inch hard drive bay |

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## Bezel Blanks

To remove a bezel blank from the front bezel:

**CAUTION:** Before removing the front bezel, make sure that the server is powered down, all cables are disconnected from the server, and the power cord is disconnected from the grounded (earthed) AC outlet.

1. Remove the front bezel. See "Front Bezel" earlier in this chapter.
2. On the back side of the front bezel, pinch the tabs ❶ on either end of the bezel blank toward each other, and then push the bezel blank ❷ through the front bezel.

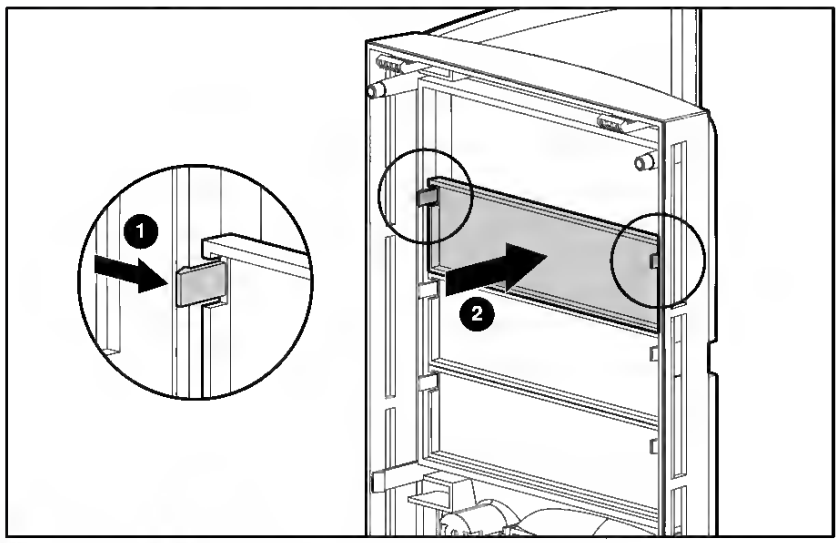


Figure 2-4. Removing a bezel blank

Reverse steps 1 through 2 to replace a bezel blank.

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## Drive Tray

To remove a drive tray from a removable media bay:

> **CAUTION:** Before removing the access panel, make sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet.

**NOTE:** The drive trays in the removable media bays can be used to mount internal 3.5-inch hard drives.

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front bezel. See "Front Bezel" earlier in this chapter.
3. Remove the access panel. See "Access Panel" earlier in this chapter.
4. Remove the screws on either side of the drive tray ❶, and then gently slide the drive tray ❷ out of the front of the chassis.

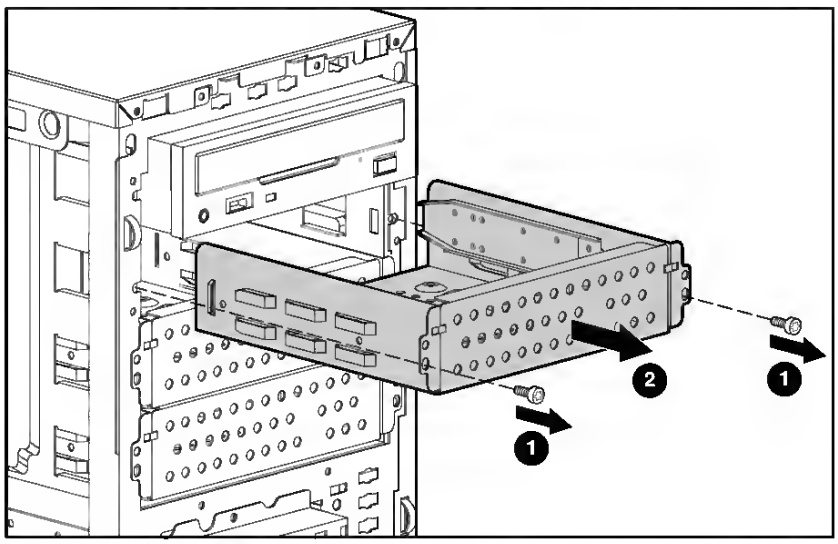


Figure 2-5. Removing a drive tray

Reverse steps 1 through 4 to replace a drive tray.

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## Hard Drive Compartment

To remove a hard drive compartment:

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front bezel door. See "Front Bezel" earlier in this chapter.
3. Remove the access panel. See "Access Panel" earlier in this chapter.
4. Disconnect all power and data cables ❶ from the back of all drives mounted in the hard drive compartment being removed.

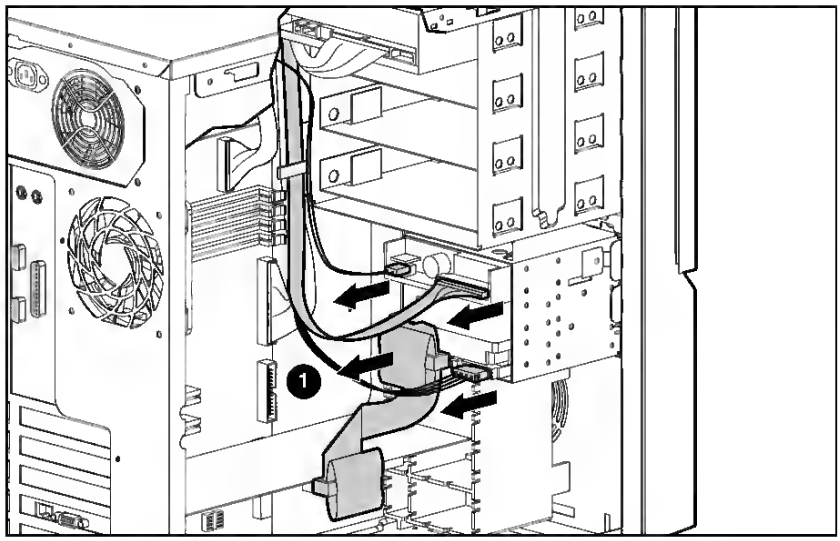


Figure 2-6. Disconnecting power and data cables from the hard drive compartment

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5. Remove the three shipping screws ❷, squeeze the two spring clips ❸, and then pull the drive compartment from the chassis ❹.

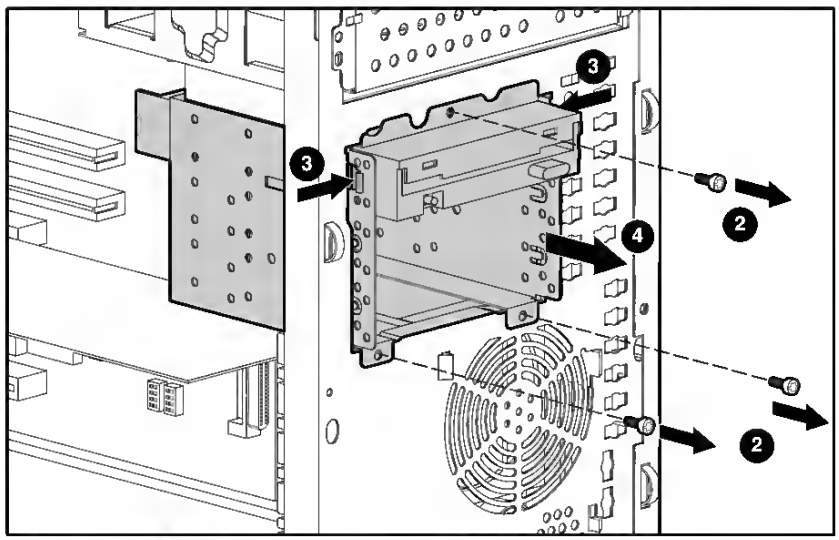


Figure 2-7. Removing a hard drive compartment

Reverse steps 1 through 5 to replace a hard drive compartment.

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## Hard Drives

To remove a hard drive from the hard drive compartment:

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front bezel. See "Front Bezel" earlier in this chapter.
3. Remove the access panel. See "Access Panel" earlier in this chapter.
4. Disconnect all the power and data cables from the back of all drives on the hard drive compartment.
5. Remove the two screws ❶ on each side of the drive.
6. Gently slide the drive ❷ out from the front of the hard drive compartment.

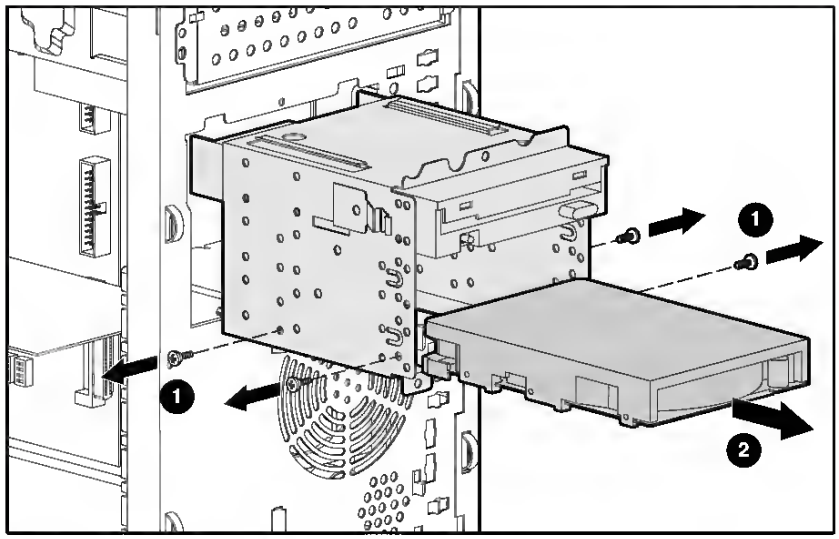


Figure 2-8. Removing a hard drive

Reverse steps 1 through 6 to replace the hard drive.

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# Power Switch

**IMPORTANT:** To completely remove all power from the system, you must disconnect the power cord from the server.

To remove the power switch:

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front bezel. See "Front Bezel" earlier in this chapter.
3. Remove the access panel. See "Access Panel" earlier in this chapter.
4. Disconnect the power switch cable ❶ from the system board.

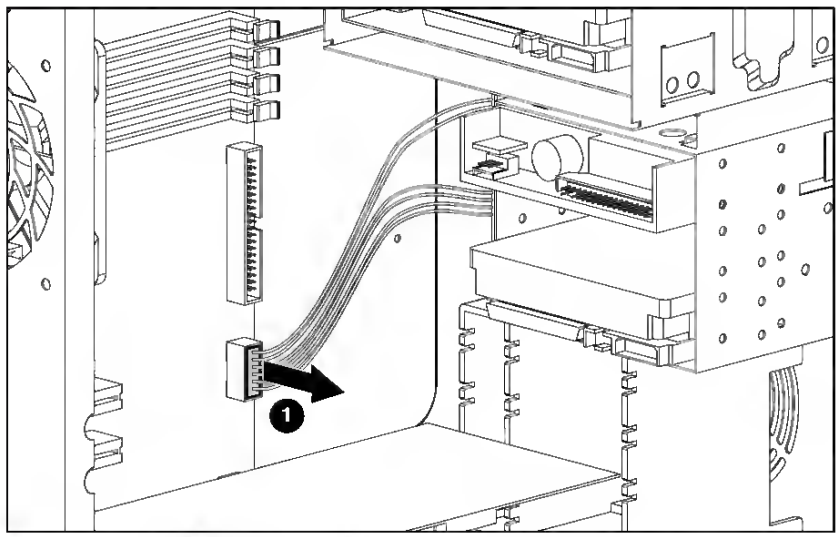


Figure 2-9. Disconnecting the power switch cable from the system board

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5. From the front of the chassis, squeeze the sides of the power switch to disengage the two retainer clips ❷ from the chassis, and then gently remove the power switch ❸ from the chassis.
6. Also from the front of the chassis, squeeze the side of the LED indicator to disengage the two retainer clips ❹ from the chassis, and then gently remove the LED indicator ❺ from the chassis.

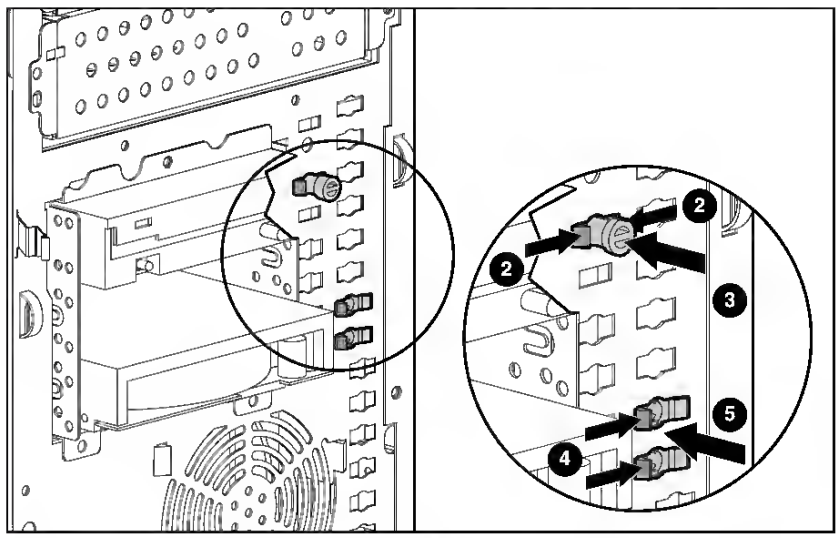


Figure 2-10. Removing the power switch and LED indicator

Reverse steps 1 through 6 to replace the power switch and LED indicator.

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# Fan

To remove the fan:

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front bezel. See "Front Bezel" earlier in this chapter.
3. Remove the access panel. See "Access Panel" earlier in this chapter.
4. Disconnect the fan power cable ❶ from the system board fan connector.
5. Use a Phillips screwdriver to remove the four mounting screws ❷ from the rear of the server.
6. Pull the fan ❸ out from the chassis.

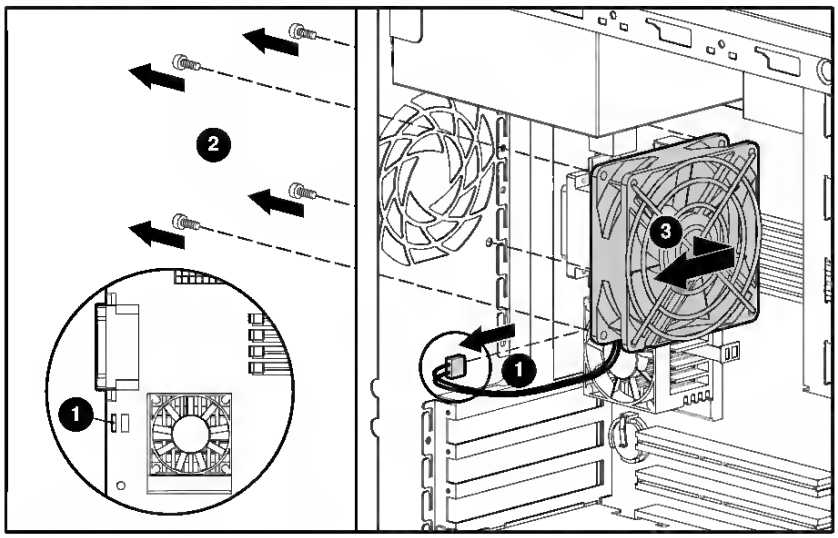


Figure 2-11. Removing the fan

Reverse steps 1 through 6 to replace the fan.

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# Cable Routing Diagrams

Figure 2-12, Figure 2-13, and Figure 2-14 show cable routing diagrams for the ProLiant ML330.

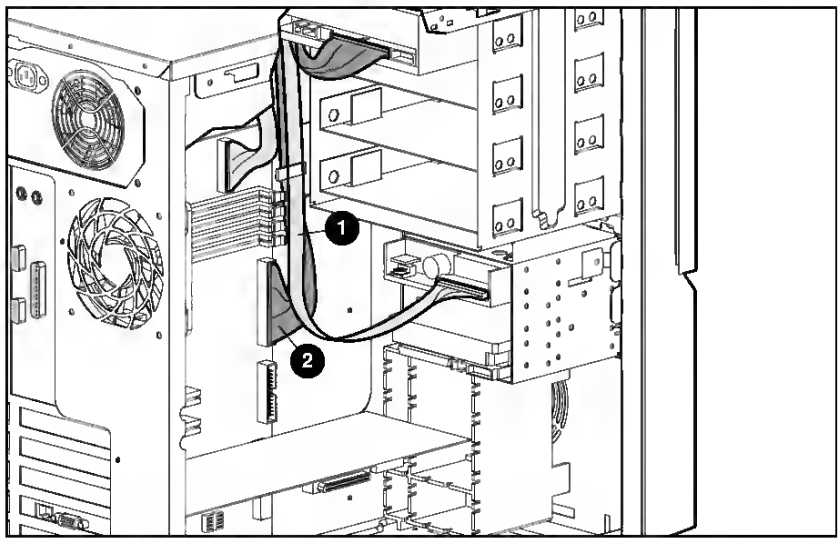


Figure 2-12. Diskette drive cable ❶ and IDE CD-ROM drive cable ❷

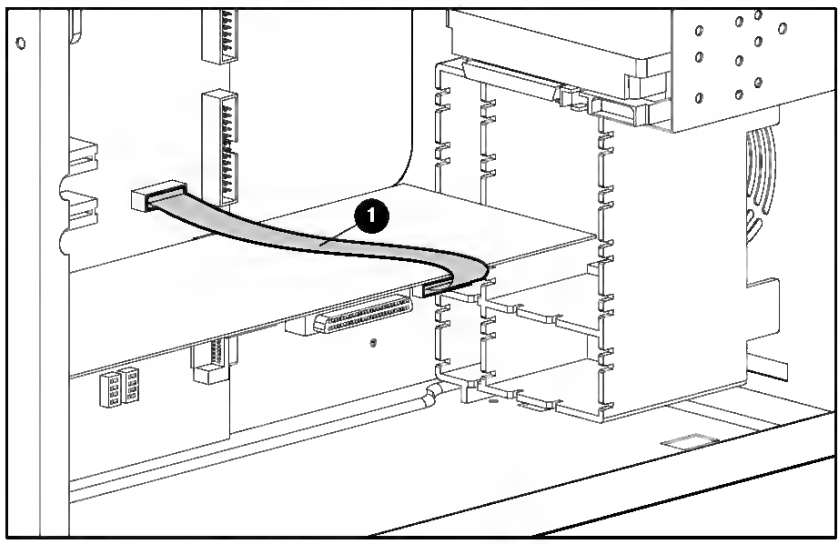


Figure 2-13. Server Management Information Cable (SMIC) ❶

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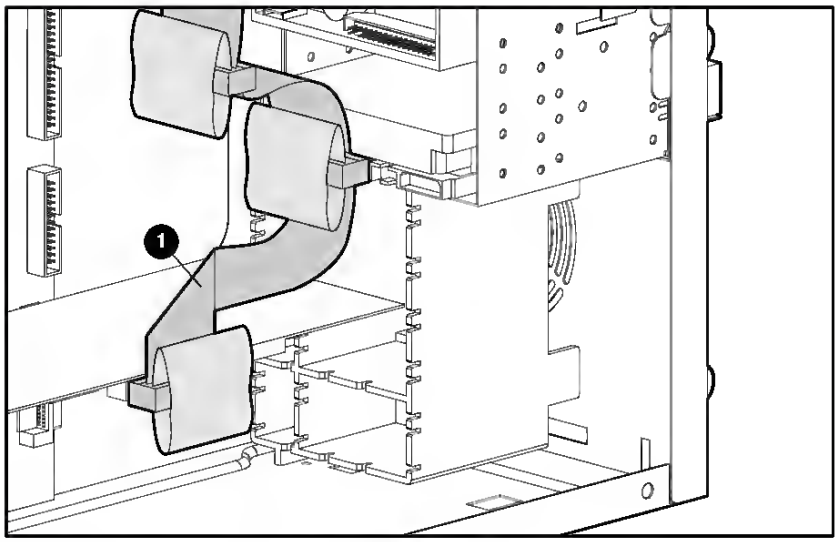


Figure 2-14. Integrated Wide Ultra2 SCSI cable ❶

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## Processor with Heatsink

To remove a processor with beatsink:

**CAUTION:** Electrostatic discharge can damage electronic components. Be sure you are properly grounded (earthed) before beginning any installation procedure. See "Electrostatic Discharge Information" earlier in this chapter for more information.

**WARNING:** To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching.

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front bezel. See "Front Bezel" earlier in this chapter.
3. Remove the access panel. See "Access Panel" earlier in this chapter.
4. Unplug the processor fan ❶ from the system board.

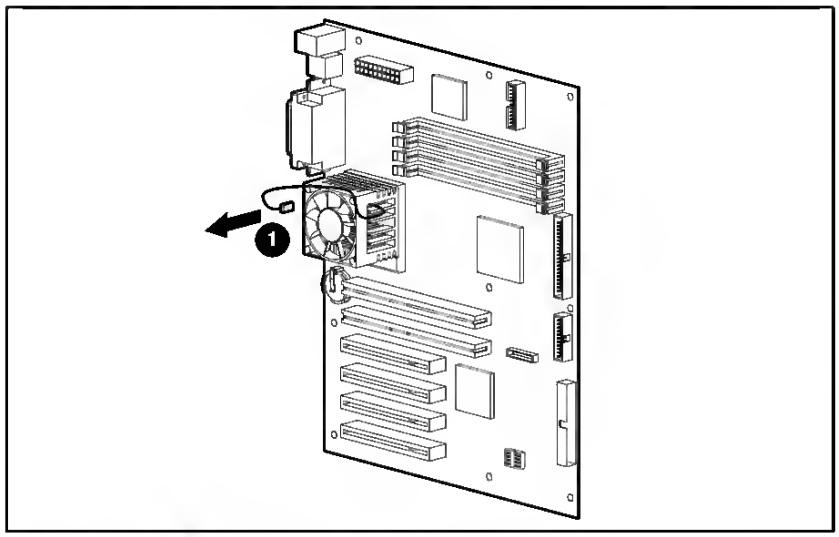


Figure 2-15. Unplugging the processor fan from the system board

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5. Press down and release the heatsink retainer clip ❷ to disengage one side from the processor socket.
6. Unhook the opposite side of the heatsink retainer clip from the processor socket, and then lift the heatsink/fan assembly ❸ from the processor socket.
7. Lift the lever ❹, located on the side of the processor socket, to release the pins of the processor, and then pull the processor from the socket ❺.

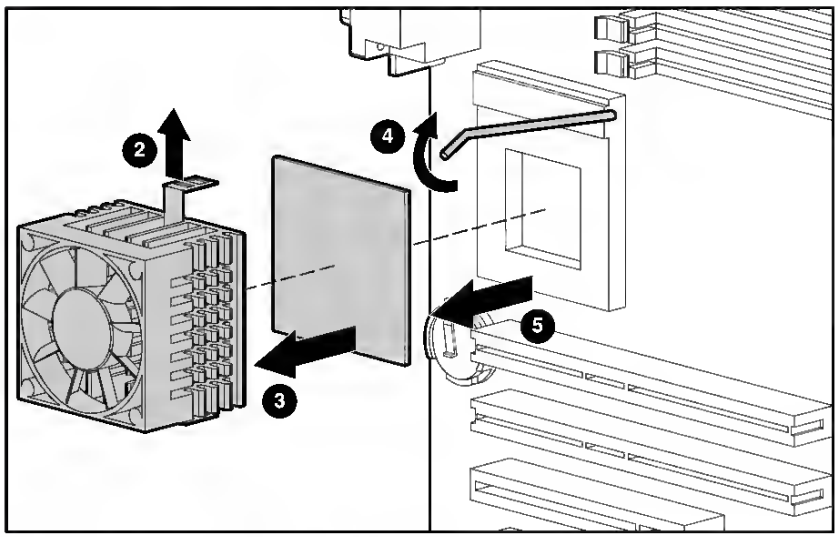


Figure 2-16. Removing the processor with the heatsink

Reverse steps 1 through 7 to replace the processor with the heatsink.

**IMPORTANT:** The processor is keyed to ensure correct alignment

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# Memory Modules

The ProLiant ML330 supports 64-, 128-, 256-, or 512-MB PC 133-MHz registered error checking and correcting (ECC) synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs).

**CAUTION:** To prevent damage to the system when handling components, see "Electrostatic Discharge Information" earlier in this chapter.

**CAUTION:** When handling a memory module, be careful not to touch any of the contacts. Doing so, may damage the module.

The following guidelines must be followed when installing or replacing memory:

- Use only 64-MB, 128-MB, 256-MB, or 512-MB registered PC 133-MHz ECC SDRAM DIMMs.
- Memory modules must be industry-standard, 168-pin, PC 133-MHz registered SDRAM DIMMs. The SDRAM DIMMs must support CAS Latency 3 (CL=3).
- Do not mix ECC and non-ECC SDRAM DIMMs. If different types of memory modules are mixed, the system does not function properly.

**NOTE:** Memory modules do not need to be installed in pairs and can be installed in any available slot.

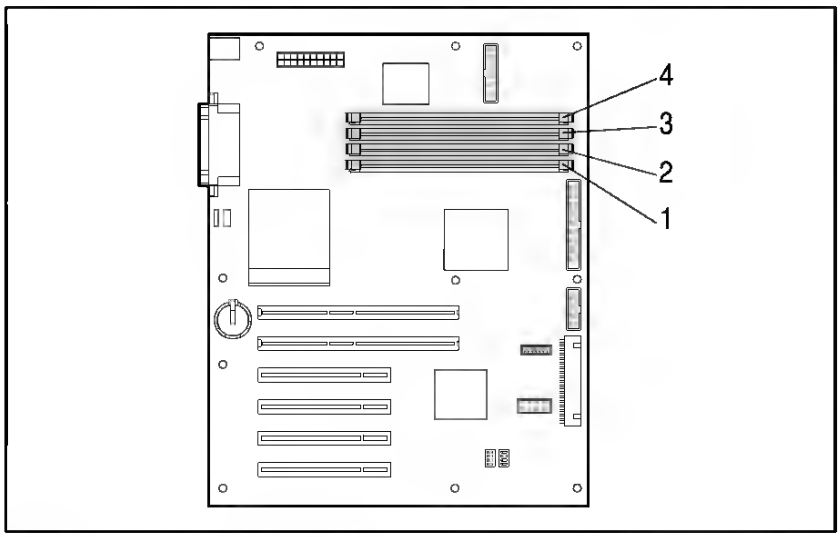


Figure 2-17. Memory module slot locations

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## Removing a Memory Module

To remove a memory module:

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front hezel. See "Front Bezel" earlier in this chapter.
3. Remove the access panel. See "Access Panel" earlier in this chapter.
4. Press outward on hoth latches ❶ of the memory module slot at the same time. This step releases the DIMM and pushes it partially out of the slot.
5. Lift the memory module ❷ from the slot.

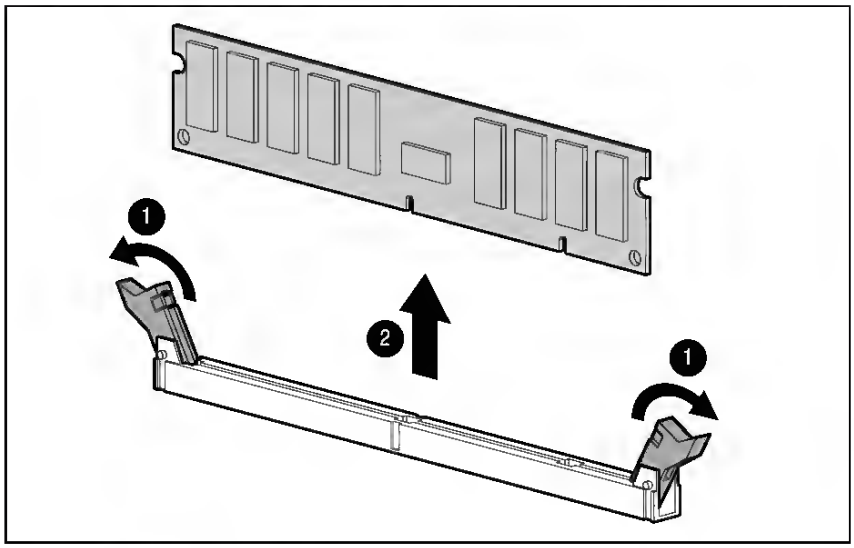


Figure 2-18. Removing a memory module

Reverse steps 1 through 5 to replace a memory module.

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# Expansion Slots

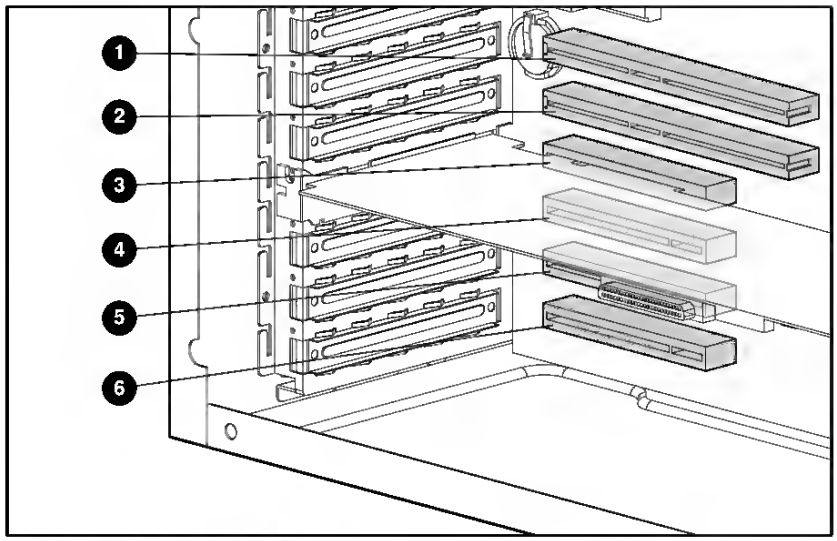


Figure 2-19. Expansion slot locations

**Table 2-2**
**Expansion Slots**

| Item | Slot Type | Slot Number |
|---|---|---|
| ❶ | 64-bit PCI (half-length) | 1 |
| ❷ | 64-bit PCI | 2 |
| ❸ | 32-bit PCI (Server Feature Board) | 3 |
| ❹ | 32-bit PCI | 4 |
| ❺ | 32-bit PCI | 5 |
| ❻ | 32-bit PCI | 6 |

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## Server Feature Board

To remove a Server Feature Board:

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front bezel. See "Front Bezel" earlier in this chapter.
3. Remove the access panel. See "Access Panel" earlier in this chapter.
4. Disconnect any cables connected to the Server Feature Board.
5. Remove the screw ❶ securing the Server Feature Board to the chassis, and then pull the Server Feature Board ❷ out of the server.

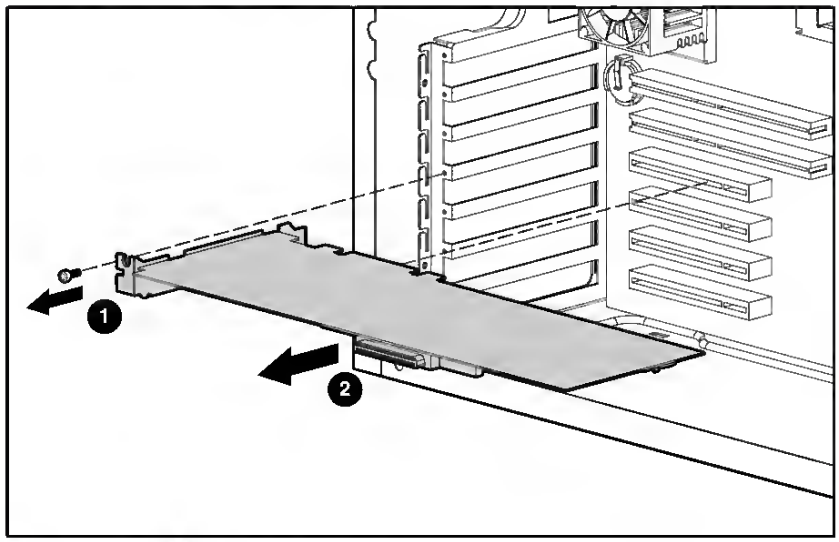


Figure 2-20. Removing the Server Feature Board

**NOTE:** The Server Feature Board is only located in slot 3.

Reverse steps 1 through 5 to replace the Server Feature Board.

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# Expansion Board Guide

To remove the expansion board guide:

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front bezel. See "Front Bezel" earlier in this chapter.
3. Remove the access panel. See "Access Panel" earlier in this chapter.
4. Remove all expansion boards supported by the board guide.
5. Push in the four locking tabs ❶, and then pull the guide back and away from the chassis ❷.

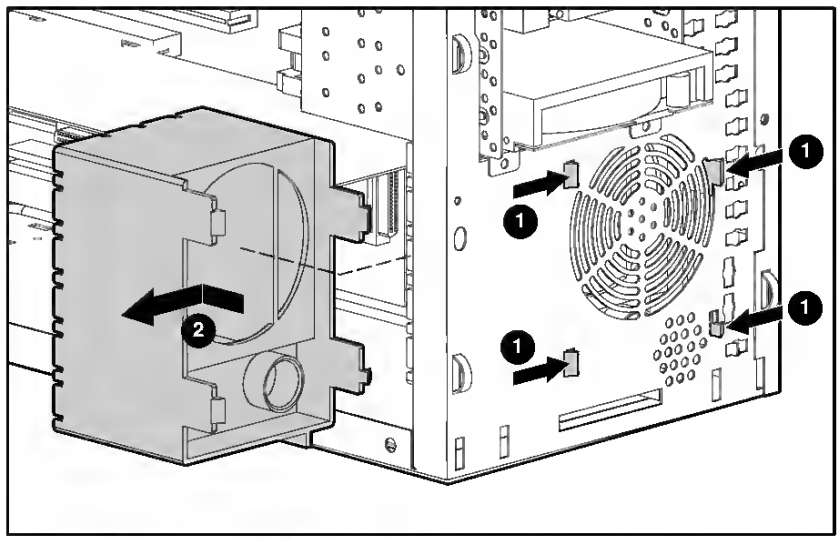


Figure 2-21. Removing the expansion board guide

Reverse steps 1 through 5 to replace the expansion board guide.

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# System Board

**CAUTION:** Static electricity can damage the electronic components of the server. Before beginning these procedures, be sure you are discharged of static electricity by touching a grounded (earthed) metal object.

To remove the system board:

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front bezel. See "Front Bezel" earlier in this chapter.
3. Remove the access panel. See "Access Panel" earlier in this chapter.
4. Remove all expansion boards seated on the system board.
5. Disconnect all cables from the system board.
6. Remove the 10 Torx T-15 screws ❶ securing the system board to the chassis.
7. Pull the system board ❷ out of the chassis.

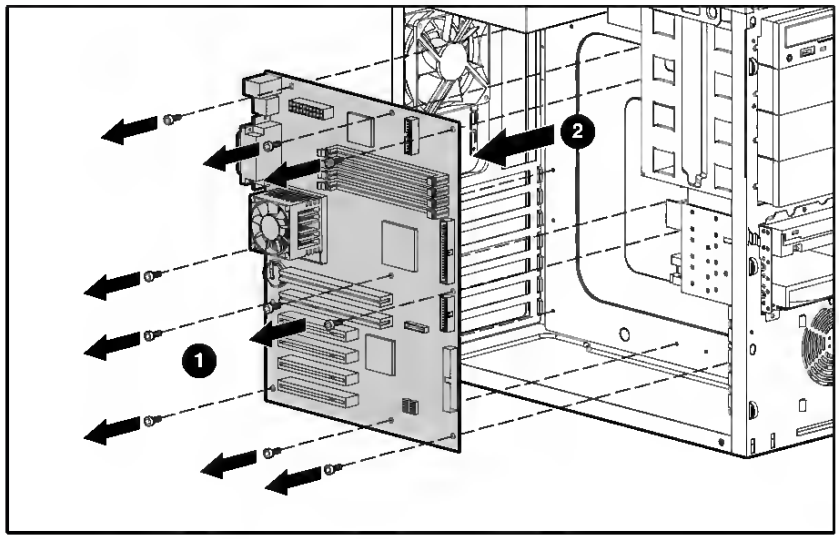


Figure 2-22. Removing the system board

Reverse steps 1 through 7 to replace the system board.

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# Power Supply

To remove the power supply:

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.

**CAUTION:** To reduce the risk of electric shock or damage to the equipment:

- Unplug the power cord before removing the power supply from the server.
- Install the power supply before connecting the power cord to the power supply.

**CAUTION:** To avoid dropping the power supply, pull out and hold the power supply with a firm grip.

2. Remove the front bezel. See "Front Bezel" earlier in this chapter.
3. Remove the access panel. See "Access Panel" earlier in this chapter.
4. Remove the four screws ❶ securing the power supply to the rear of the chassis.
5. Slide the power supply ❷ forward, and then lift the power supply from the chassis.

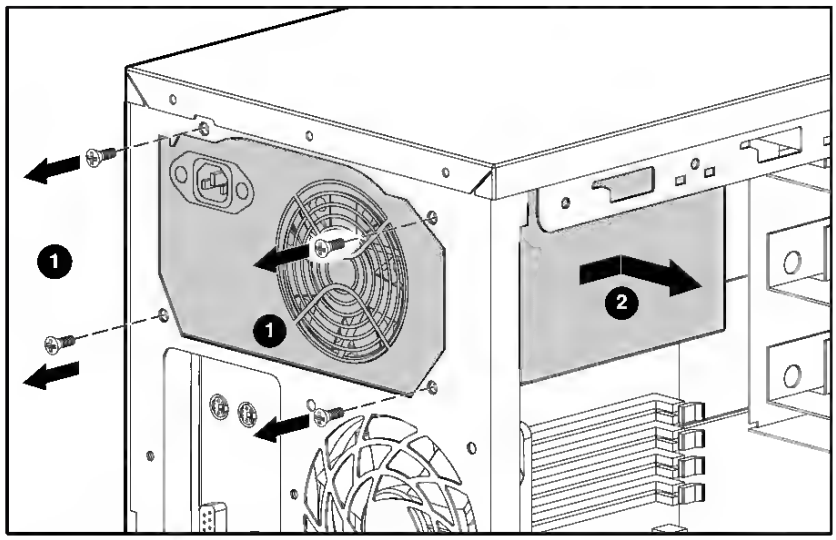


Figure 2-23. Removing the power supply

Reverse steps 1 through 5 to replace the power supply.

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# Replacing a Battery

The ProLiant ML330 bas nonvolatile memory, whicb requires a battery to retain system information. There is a battery on the system board and a battery on the Server Feature Board. These batteries are required to maintain certain system data.

## Replacing the System Board Battery

If your server no longer automatically displays tbe correct date and time, you may need to replace the battery that provides power to the real-time clock. When replacing a battery, use a CR2032 3-volt lithium coin cell battery.

**WARNING:** The system board contains a lithium battery. There is a risk of fire and chemical burn if the battery is handled improperly. Do not disassemble, crush, puncture, or short external contacts, dispose of in water or fire, or expose the battery to temperatures higher than 60°C (140°F).

**CAUTION:** Static electricity can damage the electronic components of the server. Before beginning these procedures, be sure you are discharged of static electricity by briefly touching a grounded (earthed) metal object.

To remove the lithium battery from the system board:

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front bezel. See "Front Bezel" earlier in this chapter.
3. Remove the access panel. See "Access Panel" earlier in this cbapter.

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4. Locate the battery ❶ on the system board, and then slide the battery out of the holder ❷.
5. Slide the replacement battery into the proper position with the positive (+) side up.

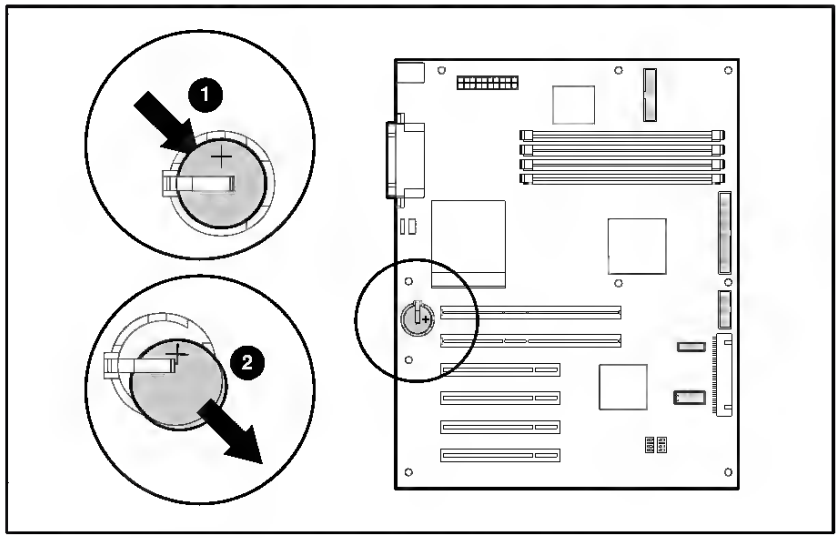


Figure 2-24. Locating and removing the battery from the system board

**IMPORTANT:** Positive (+) polarity should be positioned up.

6. Run the BIOS Setup Utility to reconfigure your system.

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## Replacing the Server Feature Board Battery

**WARNING:** The system board contains a lithium battery. There is a risk of fire and chemical burn if the battery is handled improperly. Do not disassemble, crush, puncture, or short external contacts, dispose of in water or fire, or expose the battery to temperatures higher than 60°C (140°F).

**CAUTION:** Static electricity can damage the electronic components of the server. Before beginning these procedures, be sure you are discharged of static electricity by briefly touching a grounded (earthed) metal object.

To remove the lithium battery from the Server Feature Board:

1. Complete the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front bezel. See "Front Bezel" earlier in this chapter.
3. Remove the access panel. See "Access Panel" earlier in this chapter.
4. Remove the Server Feature Board. See "Server Feature Board" earlier in this chapter.
5. Locate the battery ❶ on the Server Feature Board, and then slide the battery out of the holder ❷.
6. Slide the replacement battery into the proper position with the positive (+) side up.

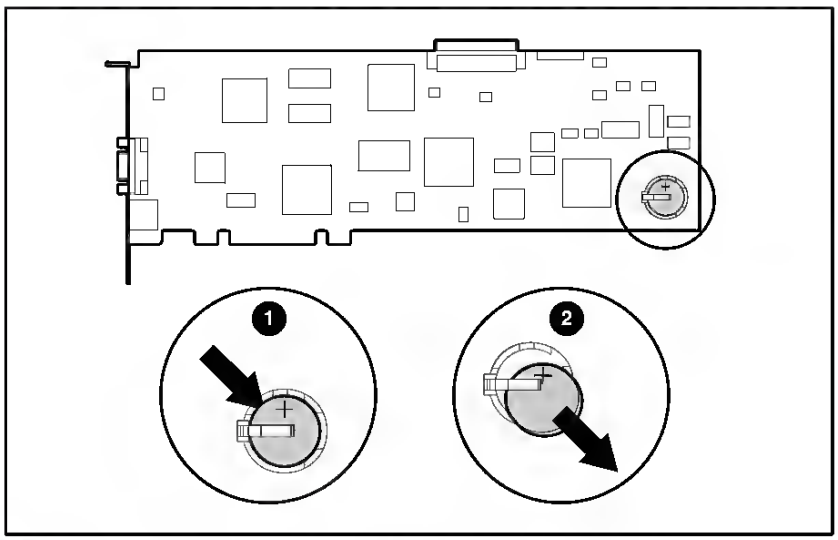


Figure 2-25. Locating and removing the battery from the Server Feature Board

**IMPORTANT:** Positive (+) polarity should be positioned up.

7. Replace the Server Feature Board, front panel, and bezel.
8. Connect the server and power up.
9. Run the BIOS Setup Utility to reconfigure your system.

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Chapter 3

# Diagnostics and Troubleshooting

This chapter describes software and firmware diagnostic tools available for Compaq server products utilizing the Server Feature Board. The sections in this chapter are:

- Diagnostic Tools Overview
- Default Configuration
- Utilities Access
- POST Error Messages
- Diagnostics Software
- Array Diagnostic Utility (ADU)
- Integrated Management Log (IML)
- Event List
- Rapid Error Recovery
- ROMPaq Error Recovery Options
- Compaq Insight Manager

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# Diagnostic Tools Overview

These tools were developed to assist in diagnosing problems, testing the hardware, and monitoring and managing Compaq server hardware.

**Table 3-1**
**Diagnostic Tools**

| Tool | What it is | How to run it |
|---|---|---|
| Compaq Diagnostics | Utility to assist testing and verifying operation of Compaq hardware. If problems are found, Compaq Diagnostics isolates the failure down to the replaceable part, whenever possible. | Compaq Diagnostics software is available on the Compaq SmartStart and Support Software CD. Create a Diagnostics diskette from SmartStart and Support Software CD, and run Diagnostics from diskette. |
| Compaq Insight Manager | A client/server application used to remotely manage Compaq hardware in a network environment. Reports hardware fault conditions (both failure and pre-failure) and collects data for reporting and graphing. | For more information, refer to the Compaq Management CD and the *Compaq Insight Manager User Guide*.<br>More information on viewing and printing the event list can be found in the Compaq Insight Manager section of this chapter. |
| Compaq Survey Utility | An online information gathering agent that runs on servers, gathering critical hardware and software information from various sources. A utility for servers running Microsoft Windows NT or Novell NetWare.<br>If a significant change occurs between data gathering intervals, previous information is marked, and the survey text file is overwritten to reflect the latest configuration and changes since the last configuration. This allows a historical record of change events for server hardware and software. | Install Survey from SmartStart, the Compaq Integration Maintenance Utility, or the Compaq Management CD. |

*continued*

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**Table 3-1**
**Diagnostic Tools** *continued*

| Tool | What it is | How to run it |
|---|---|---|
| Array Diagnostics Utility (ADU) | A Windows-based tool designed to run on all Compaq systems that support Compaq array controllers. Two main functions of ADU are to collect all possible information about the array controllers in the system and to generate a list of detected problems. | Use the information provided in Array Diagnostics Utility (ADU) later in this chapter. |
| Integrated Management Log (IML) | A log of system events, such as system failures or nonfatal error conditions. View events in the Integrated Management Log (IML) from within:<br>■ Compaq Insight Manager<br>■ Compaq Survey Utility<br>■ Compaq IML Viewers | The Integrated Management Log (IML) requires Compaq operating system-dependent drivers. Refer to the Compaq Support Software CD for instructions on installing the appropriate drivers. |
| BIOS Setup Utility | Utility to configure the hardware installed in or connected to the server. Specifically, it can:<br>■ Configure PCI boards automatically<br>■ Manage installation of memory, processor upgrades, and mass storage devices such as hard drives, tape drives, and diskette drives<br>■ Store configuration information in nonvolatile memory<br>■ Assist in installation of an operating system | The BIOS Setup Utility is loaded during POST if the **F10** key is pressed. When "F10-Setup" displays in the lower right corner of the screen, press the **F10** key to initiate the utility. |

# Default Configuration

When the system is first powered up, the system ROM detects the unconfigured state of the hardware and provides default configuration settings for most devices. By providing this initialization, the system can run Diagnostics and other software applications before running tbe normal SmartStart and operating system (OS) installation programs.

Select the primary operating system in the BIOS Setup Utility before running or installing an operating system.

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# Utilities Access

The Compaq SmartStart and Support Software CD contains the SmartStart program and many of the Compaq utilities needed to maintain the system, including:

- Array Configuration Utility
- Erase Utility
- Array Diagnostic Utility (ADU)
- ROMPaq Firmware Upgrade Utilities
- Compaq Diagnostics

**CAUTION:** Do not select the Erase Utility when running the SmartStart and Support Software CD. This selection results in data loss to the entire system.

## Running Compaq Utilities

Compaq Utilities can be run from diskette or from the Compaq SmartStart and Support Software CD.

### Running the Utilities from Diskette

- Run the utilities from their individual diskettes. If you have a utility diskette newer than the version on the SmartStart and Support Software CD, use that diskette.
- Create a diskette version of the utility from the SmartStart and Support Software CD.

To create diskette versions of the utilities from the CD

1. Power up the system using the Compaq SmartStart and Support Software CD.
2. From the Compaq System Utilities screen, select Create Support Software Disks, and then select Next.
3. Select the diskette you would like to create from the list, and then follow the instructions on the screen.

### Running the Utilities from the Compaq SmartStart and Support Software CD

**IMPORTANT:** Only the Array Configuration Utility and the Array Diagnostic Utility (ADU) can be executed from the Compaq SmartStart and Support Software CD. All other utilities must be executed from diskette.

To run these utilities directly from the Compaq SmartStart and Support Software CD:

1. Power up the system using Compaq SmartStart and Support Software CD.
2. From the Compaq System Utilities screen, select the utility you wish to run, and then select Next.

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# POST Error Messages

The Power-On Self-Test (POST) is a series of diagnostic tests that runs automatically on Compaq computers when the system is powered up. POST checks firmware and assemblies to ensure that the computer system is functioning properly.

If POST finds an error in the system, an error condition is indicated by an audible message, a visual message, or both. If an error code displays on the screen during POST or after resetting the system, follow the instructions in the following table. The error messages and codes listed include all codes generated by Compaq products. Your system generates only the codes that are applicable to your configuration and options.

**NOTE:** Many of the actions listed require you to run Compaq Diagnostics or the BIOS Setup Utility appropriate to your server. Steps for running these utilities are also provided in the *Compaq Servers Troubleshooting Guide*.

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**Table 3-2**
**POST Error Messages**

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| A Correctable Memory Error occurred prior to this power-up | None | A memory module has experienced an error that, while recoverable, has generated a predictive failure warning. | Run Compaq Diagnostics to identify the failed memory module, and then replace it. |
| A Cntical Error occurred prior to this power-up | None | A catastrophic system error, which caused the server to lock up or stop responding, has been logged. | Run Compaq Diagnostics. Replace failed assembly as indicated. |
| *Beeps only* | 2 long | No valid memory is present in the system. | 1. If no memory modules are present, install at least one memory module to conform to minimum hardware configuration specifications<br>2. Reseat all installed memory modules.<br>3. If the system contains more than one memory module, remove one module, and restart the server. Repeat as needed to isolate the bad memory module. |
| *Beeps only* | 2 long, 2 short | The power has cycled because the temperature is too hot. The processor fan is not installed, or is not spinning. | Check fans. |
| Critical Fan Failure Detected – System Shutting Down<br>System Halted | None | A critical fan is not spinning. | 1. Check fans.<br>2. Check fan cable connections. |

*continued*

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| ECC Multiple Bit Error Detected in DIMM: | None | A memory module failure generated a multiple bit error that could not be corrected. | Run Compaq Diagnostics and replace failed memory module as indicated. |
| FATAL ROM ERROR: The System ROM is not properly programmed. | 1 long, 1 short | The System ROM is not properly programmed. | Flash the ROM or replace the physical ROM part. |
| Initialization failure<br>Re-seat the processor and Processor Power Module (PPM) before attempting replacement | None | Processor was not fully seated.<br>A processor internal failure occurred. | Reseat the processor. |
| Invalid electronic serial number | None | Serial number in BIOS is incorrect. | Run BIOS Setup Utility to program serial number. |
| No SCSI Devices Detected | None | No SCSI devices are connected to the boot controller. | Verify configuration. Check SCSI cable, attached drives, and SCSI IDs. |
| NonSystem disk or disk error | None | No bootable disk partition was found on the boot drive. | 1. Remove diskette from diskette drive.<br>2. Check controller order in BIOS Setup Utility.<br>3. Check boot order in BIOS Setup Utility.<br>4. Reinstall operating system. |
| Parity Check 2 | None | A PCI device generated a parity error 2. | Remove recently added PCI adapters. Re-add the adapters one at a time to determine which is generating errors. Replace the failed device. |
| (RESUME – F1 key) | None | Continue as indicated onscreen. | Press **F1.** |

*continued*

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| (Run BIOS Setup Utility – F10 key) | None | A configuration error occurred during POST. | Press **F10** to run BIOS Setup Utility. |
| Unsupported Processor Oetected System Halted | 1 long, 1 short | Processor not supported by current system ROM. | Check documentation for supported processors. If supported, remove the processor and update system to latest ROM, then reinstall processor. |
| Unsupported Server Feature Board Oetected System Halted | | System halted. | |
| 101-ROM Error | 1 long, 1 short | System ROM checksum. | Run Compaq Oiagnostics. Replace failed assembly as indicated. |
| 101-I/O ROM Error | None | Options ROM checksum. | Run Compaq Oiagnostics. Replace failed assembly as indicated. |
| 102-System Board Failure | None | 8237 OMA controllers, 8254 timers, and so on. | Replace the system board. Run the BIOS Setup Utility. |
| 104-ASR-2 Timer Failure | None | System board failure. | Run Compaq Oiagnostics. Replace failed assembly as indicated. |
| 105-Current System ROM is corrupt – now booting redundant System ROM | 2 long | Nonbooted ROM image is corrupted. | Flash the ROM utilizing ROMPaq. Refer to the ROMPaq Oisaster Recovery section of this guide. |
| 162-System Options Not Set | 2 short | Configuration incorrect. | Run the BIOS Setup Utility and correct. |
| 163-Time and Oate Not Set | 2 short | Invalid time or date in configuration memory. | Run the BIOS Setup Utility and correct. |
| 164-Memory Size Error | 2 short | Configuration memory incorrect. | Run the BIOS Setup Utility and correct. |
| 172-Configuration Nonvolatile Memory Invalid | None | Nonvolatile configuration corrupted. | Run the BIOS Setup Utility and correct. |
| 173-Slot IO Mismatch | None | Board replaced, configuration not updated | Run the BIOS Setup Utility and correct. |

*continued*

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 174-Configuration/Slot Mismatch Device Not Found | None | EISA or PCI board not found. | Run the BIOS Setup Utility and correct. |
| 175-Configuration/Slot Mismatch Device Found | None | EISA or PCI board added, configuration not updated. | Run the BIOS Setup Utility and correct. |
| 177-Configuration Not Complete | None | Incomplete system configuration detected. | Run the BIOS Setup Utility and correct. |
| 178-Processor Configuration Invalid | None | Processor type or step does not match configuration memory. | Run the BIOS Setup Utility and correct. |
| 180-Log Reinitialized | None | The Integrated Management Log (IML) has been reinitialized, probably due to corruption of the log. | Event message, no action required. |
| 201-memory:error | None | RAM failure detected. | Run Compaq Diagnostics. Replace failed assembly as indicated. |
| 202-Memory Type Mismatch | 2 short | An incompatible memory module is installed in the system. | Compare Compaq part numbers from installed memory modules with the manual<br>If not listed, the memory modules are incompatible and should be replaced or removed |
| 203-Memory Address Error | None | RAM failure detected. | Run Compaq Diagnostics. Replace failed assembly as indicated. |
| 207-ECC Corrected Single Bit Errors in DIMM in Memory Module Socket | 2 short | A memory module is malfunctioning. | Run Compaq Diagnostics. Replace or remove malfunctioning memory module as indicated. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 207-Invalid Memory Configuration – Check DIMM Installation | None | Memory module installed incorrectly. | Verify placement of memory modules. |
| 208-Invalid Memory Speed – Check DIMM Installation | 1 long, 1 short | The speed of the memory is not compatible. | Verify the speed of the memory modules installed, then check your server user documentation and replace as indicated. |
| 209-Memory Detection Failure. Check Memory Installation | 1 long, 1 short | Unable to size memory. | Check memory module installation. If error persists, call Compaq authorized service provider. |
| 211-Invalid Voltage Regulator Module installed for Processor *X* | None | Nonredundant PPM installed in indicated processor slot. | Replace with a PPM that supports redundancy. |
| 212-System Processor Failed/Mapped out | 1 short | Processor in slot *X* failed. | Run Compaq Diagnostics and replace failed processor. |
| 214-DC-DC Converter Failed | None | PPM failed. | Run Compaq Diagnostics. Replace failed assembly as indicated. |
| 214-Memory Device Failure. Error Code:*X* Memory Module DIMM:*Y* | 2 short | A memory module has failed. | Run Compaq Diagnostics. Replace failed memory module as indicated. |
| 214-Processor PPM Failed, Module *X* | None | Indicated PPM failed. | Replace failed assembly as indicated. |
| 215- Power Module has lost Redundancy in Socket *X* | None | PPM (DC-DC converter) has lost redundancy. | Run Compaq Diagnostics. Replace failed assembly as indicated. |
| 215- Nonfunctioning for Processors | None | PPM (DC-DC converter) failed or lost redundancy | Run Compaq Diagnostics. Replace failed assembly as indicated. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 216-Voltage Regulator Module for Processor *X* no longer redundant | None | Redundancy failed in PPM. | To restore redundancy, replace the PPM. |
| 216-Processor PPM has lost Redundancy, Module *X* | None | Indicated PPM has lost redundancy. | Replace failed assembly as indicated. |
| 218-Cache Accelerators Not Installed System Halted | None | Cache Accelerators either not installed or improperly installed. | Check Cache Accelerator installation. |
| 219-Tag Update Rules SRAM Failure. System Halted | None | Catastrophic chipset failure occurred. | Call Compaq authorized service provider. |
| 219-Snoop Rules SRAM Failure. System Halted | None | Catastrophic chipset failure occurred. | Call Compaq authorized service provider. |
| 220-Cache Accelerator Slot *X* Initialization Failed System Halted | None | Cache Accelerator in slot *X* improperly installed or bad. | Check Cache Accelerator installation and if properly installed, replace. |
| 221-Power Fault On Processor Bus *X* | None | A PPM on indicated bus is in a failed state. | Run Compaq Diagnostics. Replace failed assembly as indicated. |
| 301-Keyboard Error | None | Keyboard failure occurred. | Power down the computer, then reconnect the keyboard. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 301-Keyboard Error or Test Fixture Installed | None | Keyboard failure occurred. | Replace the keyboard. |
| *ZZ*-301-Keyboard Error | None | Keyboard failure occurred. (*ZZ* represents the Keyboard Scan Code.) | 1. A key is stuck. Try to free it.<br>2. Replace the keyboard. |
| 303-Keyboard Controller Error | None | System board, keyboard, or mouse controller failure occurred. | 1. Run Compaq Diagnostics.<br>2. Replace failed assembly as indicated. |
| 304-Keyboard or System Unit Error | None | Keyboard, keyboard cable, or system board failure. | 1. Make sure the keyboard is attached.<br>2. Run Compaq Diagnostics.<br>3. Replace the indicated part. |
| 40*X*-Parallel Port *X* Address Assignment Conflict | 2 short | Both external and internal ports are assigned to parallel port *X*. | Run the BIOS Setup Utility and correct. |
| 404-Parallel Port Address Conflict Detected<br>A hardware conflict in your system is keeping some system components from working correctly. If you have recently added new hardware remove it to see if it is the cause of the conflict. Alternatively, use Computer Setup or your operating system to confirm that no conflicts exist. | 2 short | A hardware conflict in your system is preventing the parallel port from working correctly. | 1. If you have recently added new hardware, remove it to see if the hardware is the cause of the conflict.<br>2. Run your BIOS Setup Utility to reassign resources for the parallel port and manually resolve the resource conflict.<br>3. Run Compaq Diagnostics to resolve the issue. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 601-Diskette Controller Error | None | Diskette controller circuitry failure occurred. | 1. Make sure the diskette drive cables are attached.<br>2. Replace the diskette drive, cable, or both.<br>3. Replace failed assembly as indicated. |
| 602-Diskette Boot Record Error | None | The boot sector on the boot disk is corrupt. | 1. Remove diskette from the diskette drive.<br>2. Replace diskette in drive, cable, or both.<br>3. Reformat diskette. |
| 605-Diskette Drive Type Error | 2 short | Mismatch in drive type occurred. | Run the BIOS Setup Utility to set diskette drive type correctly. |
| 611-Primary Floppy Port Address Assignment Conflict | 2 short | A hardware conflict in your system is preventing the diskette drive from operating properly. | 1. Run your BIOS Setup Utility to configure the diskette drive port address and manually resolve the conflict.<br>2. Run Compaq Diagnostics and replace failed assembly as indicated. |
| 800-Server Feature Board must be installed in slot 3 for proper operation | None | The system has detected the absence of the Server Feature Board<br>The Server Feature Board is not installed in the proper slot, slot 3.<br>The Server Feature Board does not match this system. | 1. Install the Server Feature Board in PCI slot 3.<br>2. Reseat the Server Feature Board.<br>3. Verify that the Server Feature Board is from this system. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 801-Server Feature Board is not properly cabled to the system. Verify that the server management information cable from the system board to the Server Feature Board in slot 3 is intact and fully seated at both ends | None | The system has detected that the server management information cable is not properly installed | 1. Make sure that a server management information cable is installed in the system.<br>2. Inspect the server management information cable for signs of damage.<br>3. Reseat the server management information cable on the system board and on the Server Feature Board. |
| 802-Processor is missing or terminator board is not present. System Halted | None | The system detected that the indicated processor slot is empty. | 1. Verify that a processor or processor terminator module is installed in each processor slot.<br>2. Reseat the processor or processor terminator module in each processor slot.<br>3. Verify that each processor has a corresponding processor power module installed.<br>4. Try replacing each processor with a processor terminator module to detect a failed processor or PPM. |
| 803-Processor speeds must match for system operation. System Halted | None | Two processors with different speed ratings are installed in the system.<br>All installed processors must have the same speed rating for safe operation. | 1. Replace one of the processors with a processor terminator module.<br>2. Replace one of the processors with an alternate processor rated for the same operating speed as the installed processor. |
| 804-100MHz memory is incompatible. System Halted | None | A memory module other than 133-Hz ECC-registered SDRAM DIMM has been detected. | 1. Reseat all memory modules in the system.<br>2. Remove incompatible memory modules.<br>3. Sequentially try each memory module in DIMM slot 1 to identify the incompatible memory module. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 805-The bootstrap processor is not the lowest stepping processor in the system. This is unsupported configuration. Swap the position of the processors on the system board to correct this issue. | None | The system has detected that the processors in the system are not the same stepping and that the processor in processor slot 1 has a lower stepping than the processor in processor slot 2. The processor in processor slot 2 must have the same or lower stepping than the processor in processor slot 1. (Processor stepping is a designation that reflects the processor generation.) | 1. Remove the processor from processor slot 1.<br>2. Remove the processor from processor slot 2.<br>3. Install the processor from processor slot 1 into processor slot 2.<br>4. Install the remaining processor into the available processor slot. |
| 806-NVRAM has been reset<br>Please power off the system and restore SW1 2 to the default position. Run BIOS Setup to set default values.<br>System Halted | None | The system configuration switch (SW1), position 2 has been turned on and the system configuration data has been cleared from CMOS. This switch must be returned to the default off position for normal operation and the ability to save configuration setup data.<br>The system must be reconfigured. | 1. Power down the system.<br>2. Locate the system configuration switch (SW1). See Chapter 4 for instructions.<br>3. Return SW1 2 to the off position<br>4. Restart the system.<br>5. Press **F10** to run the BIOS Setup Utility and configure the system.<br>6. Select the primary operating system.<br>7. Set the date and time.<br>8. Complete additional configuration as needed. |
| 807-The Setup password is cleared. Please power off and restore the clear password switch (SW1.1) | None | The system board configuration switch SW1.1 has been turned on and the system configuration password has been cleared. SW1.1 must be returned to the default off position for normal operation and the ability to set a password with the BIOS Setup Utility. | 1. Power down the system.<br>2. Locate the system board configuration switch.<br>3. Return SW1.1 to the off position<br>4. Restart the system.<br>5. Press **F10** and use the BIOS Setup Utility to set a new password. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 912-Intruder Alert | None | The bezel (front cover) is not installed<br><br>The bezel (front cover) was removed since last power up | Verify that system access was authorized |
| 914-Intruder Message | None | Hood Lock Coil is not connected. | Check the hardware connection to the hood lock coil. |
| 1151-Com Port 1 Address Assignment Conflict. | 2 short | Both external and internal serial ports are assigned to COM1. | Run the BIOS Setup Utility and correct. |
| 1151-Serial Port A Address Conflict Detected | 2 short | A hardware conflict is preventing the normal operation of a serial port. | Run the BIOS Setup Utility to reassign the serial port address and manually resolve the conflict. |
| 1152-Com Port 2, 3, or 4 Address Assignment Conflict. | 2 short | Both external and internal serial ports are assigned to COM2, COM3, or COM4. | Run the BIOS Setup Utility and correct. |
| 1152-Serial Port B Address Conflict Detected | 2 short | A hardware conflict is preventing the normal operation of a serial port. | Run the BIOS Setup Utility to reassign the serial port address and manually resolve the conflict. |
| 1155-Serial Port Address Conflict Detected | 2 short | A hardware conflict is preventing the normal operation of a serial port. | Run the BIOS Setup Utility to reassign the serial port address and manually resolve the conflict. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1610-Temperatur e violation detected Waiting for system to cool | 2 short | Ambient system temperature too hot | Check fan and system environment. |
| 1611-CPU s failure detected | None | Required fan not spinning. | 1. Check fan.<br>2. Reseat fan cable.<br>3. Replace fan. |
| 1611-CPU Fan not present | None | Required fan not installed | 1. Check fan<br>2. Reseat fan cable.<br>3. Install missing fan. |
| 1611-CPU Fan failure detected | 2 short | CPU fan has failed. | Replace the failed CPU fan. |
| 1611-Fan failure detected | 2 short | Required fan not installed or spinning | Check fan. |
| 1611-I/O Fan failure detected | None | Required fan not spinning. | 1. Check fan.<br>2. Reseat fan cable<br>3. Replace fan. |
| 1611-I/O Fan not present | None | Required fan not installed | 1. Check fan.<br>2. Reseat fan cable<br>3. Install missing fan |
| 1611-I/O Fan failure detected. | 2 short | I/O fan has failed. | Replace the failed I/O fan. |
| 1611-System Fan failure detected | None | Required fan not spinning. | 1. Check fan.<br>2. Reseat fan cable<br>3. Replace fan. |
| 1611-System Fan not present | None | Required fan not installed | 1. Check fan<br>2. Reseat fan cable.<br>3. Install missing fan. |
| 1612-Primary power supply failure | 2 short | Primary power supply has failed. | Replace power supply as soon as possible. |
| 1613-Low System Battery. | None | Real-time clock system battery is running low on power. | Replace battery (or add external battery) as soon as possible. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1615-Power supply configuration error | None | Your configuration requires an additional power supply. A moving bar displays, to indicate that the system is waiting for another power supply to be installed. | Install the additional power supply. |
| 1615-Power Supply Failure, Power Supply Unplugged, or Power Supply Fan Failure in Bay *X*. | None | Power supply has failed. | Reseat power supply firmly.<br>-Or-<br>Replace power supply as soon as possible. |
| 1617-Fan controller not responding. System halted. | 2 short | Fan controller failure detected. | Check and replace failed controller assembly. |
| 1617-I/O Fan controller not responding. System halted. | 2 short | I/O fan controller failure detected. | Check and replace failed controller assembly. |
| 1617-CPU Fan controller not responding. System halted. | 2 short | CPU fan controller failure detected. | Check and replace failed controller assembly. |
| 1618-PCI slots powered down. Check PCI Hot-Plug enabler connectors. | None | PCI Hot Plug enabler is missing or failed. | Check and replace missing or failed assembly. |
| 1620-Locked SCSI Bus Detected. Verify SCSI bus cabling. System halted. | None | SCSI bus failure detected. | Ensure that the integrated SCSI controller has SCSI termination attached. |
| 1621-Current SCSI bus cable configuration is not recommended | None | Improper SCSI bus cabling detected. | Check documentation for proper SCSI bus cabling. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1622-Internal SCSI Jumper Board Not Installed | None | The system has detected that the array enabler board is not installed. | Install the array enabler board. |
| 1701-SCSI Controller Failure | None | Embedded SCSI controller has failed or an attached device is preventing normal operation. | 1. Check SCSI cables and verify they are fully seated<br>2. Verify SCSI IDs are assigned correctly at each SCSI device.<br>3. Remove SCSI cables from the controller and observe if the failure still occurs. If necessary, replace the cables.<br>4. Run Compaq Diagnostics.<br>5. Remove individual SCSI devices from the cable to identify a suspect device.<br>6. Replace failed assembly. |
| 1702-SCSI Cable Error Detected | None | SCSI cable has failed. | 1. Reseat the SCSI cable on the controller and all attached devices.<br>2. Check the SCSI cable at all connectors for bent pins.<br>3. Replace SCSI cable. |
| 1704-Unsupported virtual mode disk operation | None | A wrong driver is installed | DOS driver required. |
| 1705-Locked SCSI bus detected | None | The system has detected that the SCSI bus has locked up, halting the system. | Call your authorized Compaq support technician. |
| 1720-Slot *X* Drive Array – S.M.A.R.T. Hard Drive(s) Detect Imminent Failure SCSI: Port *Y*: SCSI ID *Z* | None | Hard drive predictive failure condition detected. | The indicated drive has reported a SMART predictive failure condition. It may fail in the future. If this drive is part of a non-fault-tolerant configuration, back up all data before replacing the drive and restore all data afterward. If this drive is part of a fault-tolerant configuration, do not replace this drive unless all other drives in the array are online. Press **F1** to resume. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1721-Slot *X* Drive Array – Drive parameter tracking predicts imminent failure. The following devices should be replaced when conditions permit. Do not replace drive unless all other drives in the array are on-line! Back up data before replacing drive(s) if using RAID 0. | None | Monitor and performance threshold exceeded condition | Replace the drive when it is reasonable for you to do so. The drive has not failed, but Compaq recommends you replace the drive |
| 1721- SMART SCSI Hard Drive detects imminent failure | None | Indicated drive has reported a SMART predictive-failure condition and may fail in the future. | If this drive is part of a non-fault-tolerant configuration, back up all data before replacing the drive, and restore all data afterward.<br>-Or-<br>If this drive is part of a fault-tolerant configuration, do not replace this drive unless all other drives in the array are online<br>Press **F1** to resume. |
| 1724-Slot *X* Drive Array – Physical Drive Position Change(s) Detected – Logical drive configuration has automatically been updated.<br>RESUME = F1 KEY | None | Drive change detected. | The logical drive configuration has been updated automatically following physical drive position changes. Press **F1** to resume. |
| 1726-Slot *X* Drive Array – Array Accelerator Memory Size Change Detected – Array Accelerator configuration has automatically been updated. | None | Configuration updated | The array accelerator configuration has been updated automatically due to replacement of the array accelerator (or controller), with one having different cache memory size. Press **F1** to resume |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1727-Slot *X* Drive Array – New Logical Drive(s) Attachment Detected. If more than 32 logical drives, this message will be followed by: "Auto-configuratio n failed: Too many logical drives. | None | Additional drives detected. | The controller has detected an additional array of drives that was attached when powered down. The logical drive configuration information has been updated to add the new logical drives. The maximum number of logical drives supported is 32. Additional logical drives will not be added to the configuration. Press **F1** to resume. |
| 1729-Slot 1 Drive Array – Disk Consistency Initialization in Progress – RAID 4/5 performance may be lower until Auto Reliability Monitoring has completed Automatic Background Parity Consistency Initialization. | None | Initial RAID configuration in progress. | This message is normal following the initial configuration of RAID 4 or RAID 5 logical drives. Performance of the controller improves after the parity data has been initialized by ARM (an automatic process that runs in the background on the controller). |
| 1730-Fixed Disk 0 does not support DMA Mode | None | Hard drive error detected. | Run the BIOS Setup Utility and correct. |
| 1731-Fixed Disk 1 does not support DMA Mode. | None | Hard drive error detected. | Run the BIOS Setup Utility and correct. |
| 1740-Fixed Disk 0 failed Set Block Mode command | None | Hard drive error detected. | Run the BIOS Setup Utility and correct. |
| 1741-Fixed Disk 1 failed Set Block Mode command | None | Hard drive error detected. | Run the BIOS Setup Utility and correct. |
| 1750-Fixed Disk 0 failed Identify command | None | Hard drive error detected. | Run the BIOS Setup Utility and correct. |
| 1751-Fixed Disk 1 failed Identify command | None | Hard drive error detected. | Run the BIOS Setup Utility and correct. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1752-Slot *X* Drive Array – This controller is not supported in systems with more than 3 GB of memory. The array controller will be disabled. (RESUME = F1 KEY) | None | The array controller cannot access physical system memory above the 3 GB address range. | Remove the array controller and replace with a version that addresses memory in the required range. |
| 1760-Fixed Disk 0 does not support Block Mode | None | Fixed disk error detected. | Run the BIOS Setup Utility and correct. |
| 1761-Fixed Disk 1 does not support Block Mode | None | Fixed disk error detected. | Run the BIOS Setup Utility and correct. |
| 1764-Slot *X* Drive Array – Capacity Expansion Process is temporarily disabled (followed by one of the following):<br>Expansion will resume when Array Accelerator has been reattached.<br>Expansion will resume when Array Accelerator has been replaced.<br>Expansion will resume when Array Accelerator RAM allocation is successful.<br>Expansion will resume when Array Accelerator battery reaches full charge.<br>Expansion will resume when automatic data recovery has been completed. | | | Reattach or replace array accelerator. Wait until the array accelerator batteries have charged or for Automatic Data Recovery to complete, as indicated. |
| 1765-Slot *X* Drive Array Option ROM Appears to Conflict With an ISA Card. ISA cards with 16-bit memory cannot be configured in memory range C0000 to DFFFF along with the SMART-2/E 8-bit Option ROM due to EISA bus limitations.<br>Please remove or reconfigure the ISA card. | | | 1. Remove or reconfigure conflicting ISA cards.<br>2. Disable "shared memory" on any ISA network cards that may be installed. |
| 1766-Slot *X* Drive Array requires System ROM Upgrade. Run Systems ROMPaq Utility | | | Run the latest System ROMPaq Utility to upgrade the system ROM as indicated. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1767-Slot *X* Onve Array Option ROM is Not Programmed Correctly or may Conflict with the Memory Address Range of an ISA Card. Check the Memory Address Configuration of installed ISA Card(s) or run Options ROMPaq Utility to attempt SMART-2/E Option ROM Reprogramming. | | | Remove or reconfigure conflicting ISA cards, especially any cards that are not recognized by the BIOS Setup Utility. Try reprogramming the SMART-2/E Controller ROM using the latest Options ROMPaq (version 2.29 or higher). |
| 1768-Slot *X* Orive Array – Resuming logical drive expansion process | None | SMART-2 Controller error detected. | No action required. This message displays whenever a controller reset or power cycle occurs while array expansion is in progress. |
| 1769-Slot *X* Orive Array – Orive(s) disabled due to failure during expand. Select F1 to continue with logical drives disabled. Select F2 to accept data loss and to re-enable logical drives. | None | SMART-2 Controller error detected. | Oata has been lost while expanding the array; therefore, the drives have been temporarily disabled. Press **F2** to accept the data loss and re-enable the logical drives. Restore data from backup. |
| 1770-Slot *X* Orive Array – Critical Orive Firmware Problem Oetected – Please upgrade firmware on the following drive(s) using Options ROMPaq (available from www.compaq.com). SCSI Port *Y* SCSI IO *Z*<br>(RESUME = F1 OR F2 KEY) | None | Firmware update need indicated. | The indicated drives are running firmware that is known to cause intermittent problems. Use the Compaq "Options ROMPaq" utility to upgrade firmware on all drives to the latest revision<br>Acquire from the Compaq website:<br>http://www.compaq.com/support |
| 1771-Primary Oisk Port Address Assignment Conflict | None | Internal and external hard drive controllers are both assigned to the primary address. | Run the BIOS Setup Utility and correct. |
| 1772-Secondary Oisk Port Address Assignment Conflict | None | Address assignment conflict. Internal and external hard drive controllers are both assigned to the secondary address. | Run the BIOS Setup Utility and correct. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1773-Primary Fixed Disk Port Assignment Conflict | None | Hard drive error detected. | Run the BIOS Setup Utility and correct. |
| 1774-Slot *X* Drive Array – Obsolete data found in Array Accelerator. Select F1 to discard contents of Array Accelerator. Select F2 to write contents of Array Accelerator to drives. | None | SMART-2 Controller error detected. | Data found in array accelerator is older than data found on drives. Press **F1** to discard the older data in the array accelerator and retain the newer data on the drives. |
| 1775-Slot *X* Drive Array – ProLiant Storage System Not Responding SCSI Port *Y*: Check storage system power switch and cables. Turn the system power off while checking the ProLiant power and cable connections, then turn the system power back on to retry. | None | Storage system problem detected. | Power down the system. Check external ProLiant power switch—external drives must all be powered up before or at the same time as the main system. Check cables. If retry does not help, try replacing the cable, firmware, backplane, or the Smart Array Controller. |
| 1776-Slot *X* Drive Array – SCSI Bus Termination Error – Internal and external drives cannot both be attached to the same SCSI port.<br>SCSI port *Y*: Check cables<br>RESUME = F1 Key | None | External and internal connectors of the specified SCSI ports are both attached to drives. The indicated SCSI bus is disabled until this problem is resolved. | The SCSI bus is not properly terminated when internal and external drives are attached concurrently to the same SCSI bus.<br>1. Power down the server.<br>2. Verify cabling to the specified port.<br>3. Reconfigure drives as indicated. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1777-Slot *X* Drive Array – ProLiant Drive Storage Enclosure Problem Detected (followed by one or more of the following):<br><br>SCSI Port *Y*: Cooling Fan Malfunction Detected<br><br>SCSI Port *Y*: Overheated Condition Detected<br><br>SCSI Port *Y*: Side-Panel must be Closed to Prevent Overheating<br><br>SCSI Port *Y*: Redundant Power Supply Malfunction Detected<br><br>SCSI Port *Y*: Wide SCSI Transfer Failed<br><br>SCSI Port *Y*: Interrupt Signal Inoperative<br><br>(RESUME = F1 KEY) | None | Temperature violation detected. | ■ Check cooling fan operation by placing hand over fan. Verify internal plenum cooling fan in tower servers or storage systems is operational. If fan is not operating, check for obstructions and verify all internal connections. Replace unit side panel if removed.<br><br>■ If the ProLiant Storage System power LED is amber instead of green, this indicates a redundant power supply failure.<br><br>■ Check SCSI cables. If the message indicates to check SCSI cables, verify your cabling against the diagrams in your Compaq Smart Array Controller user guide. If the routing is correct, replace cables on the specified port until the POST message is eliminated. |

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1778-Drive Array resuming Automatic Data Recovery process | None | This message displays whenever a controller reset or power cycle occurs while Automatic Data Recovery (ADR) is in progress. | No action necessary. |
| 1779-Slot *X* Drive Array – Replacement drive(s) detected OR previously failed drive(s) now operational:<br>Port *Y*: SCSI ID *Z*:<br>Restore data from backup if replacement drive *X* has been installed | None | Intermittent drive failure, loss of data, or both detected | If this message displays and drive *X* has not been replaced, this indicates an intermittent drive failure. This message also displays immediately following drive replacement whenever data must be restored from backup. |
| 1780-Disk 0 Failure | None | Hard drive/format error detected. | Run Compaq Diagnostics. Replace failed assembly as indicated. |
| 1781-Disk 1 Failure | None | Hard drive/format error detected. | Run Compaq Diagnostics. Replace failed assembly as indicated. |
| 1782-Disk Controller Failure | None | Hard disk drive circuitry error detected. | Run Compaq Diagnostics. Replace failed assembly as indicated. |
| 1783-Slot *X* Drive Array Controller Failure. | None | ROM installation problem or array accelerator board problem detected. | If this message displays immediately following a ROM installation, the ROM is defective or not installed properly. Check to see if the array accelerator board is attached properly. Check that the array controller is firmly inserted in its slot. Try upgrading the System ROM. Otherwise, replace the Smart Array Controller. |
| 1784-Slot *X* Drive Array Drive Failure. The following SCSI drive(s) should be replaced:<br>SCSI Port *Y*:<br>SCSI ID *Z*: | None | Defective drive, cables, or both detected. | Check for loose cables. Replace defective drive *X* and/or cable(s) |

*continued*

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1785-Slot *X* Drive Array not Configured (followed by one of the following): | None | Drive array configuration not detected. | (1) Run the Compaq Array Configuration Utility. |
| (1) Run Compaq Array Configuration Utility | | | |
| (2) No drives detected | | | (2) Power down the system and check SCSI cable connections to make sure drives are attached properly. |
| (3) Drive positions appear to have changed – Run Drive Array Advanced Diagnostics if previous positions are unknown. Then turn system power OFF and move drives to their original positions. | | | (3) Run Array Diagnostic Utility if previous positions are unknown. Then power down the system and move drives to their original positions. |
| (4) Configuration information indicates drive positions beyond the capability of this controller. This may be due to drive movement from a controller that supports more drives than the current controller. | | | (4) To avoid data loss, power down the system and reattach drives to the original controller. |
| (5) Configuration information indicates drives were configured on a controller with a newer firmware version. | | | (5) To avoid data loss, reattach drives to the original controller or upgrade the controller firmware to the version on the original controller using Option ROMPaq. |
| (RESUME = F1 KEY) | | | Select **F1** to resume. |

*continued*

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1786-Slot 1 Drive Array Recovery Needed. The following SCSI drive(s) need Automatic Data Recovery: SCSI Port 1: SCSI ID 0<br><br>Select F1 to continue with recovery of data to drive. Select F2 to continue without recovery of data to drive.<br><br>-Or-<br><br>Slot 1 Drive Array Recovery Needed. Automatic Data Recovery Previously Aborted! The following SCSI drive(s) need Automatic Data Recovery: SCSI Port 1: SCSI ID 0<br><br>Select F1 to retry Automatic Data Recovery to drive. Select F2 to continue without starting Automatic Data Recovery data to drive data to drive | None | System in Interim Data Recovery mode. Data has not yet been recovered. | Press **F1** to allow Automatic Data Recovery to begin. Data is automatically restored to drive *X* once the drive has been replaced or seems to be working.<br><br>-Or-<br><br>1. Press **F2** for the system to continue to operate in the Interim Data Recovery mode.<br><br>The "previously aborted" version of the 1786 POST message displays if the previous rebuild attempt was aborted for any reason.<br><br>2. Run Array Diagnostic Utility (ADU) for more information.<br><br>If the replacement drive was failed, try using another replacement drive.<br><br>-Or-<br><br>If rebuild was aborted due to a read error from another physical drive in the array, back up all readable data on the array, run Diagnostics Surface Analysis, and then restore your data. |

*continued*

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1787-Drive Array Dperating in Interim Recovery Mode.<br><br>Physical drive replacement needed: Drive *X* | None | Hard drive *X* failed or cable is loose or defective. Following a system restart, this message reminds you that drive *X* is defective and fault tolerance is being used. | 1. Check for loose cables.<br>2. Replace defective cables.<br>3. Replace drive *X* as soon as possible. |
| *** 1788-Slot *X* Drive Array Reports Incorrect Drive Replacement. The following SCSI drive(s) should have been replaced: SCSI Port *Y*: SCSI ID *Z*<br><br>The following SCSI drive(s) were incorrectly replaced: SCSI Port *y*: SCSI ID *z*.<br><br>Select F1 to continue – drive array will remain disabled.<br><br>Select F2 to reset configuration – all data will be lost. | None | Drives are not installed in their original positions, so the drives have been disabled. See note below. | 1. Reinstall the drives correctly, as indicated.<br>2. Press **F1** to restart the computer with the drive array disabled.<br><br>-Dr-<br><br>Press **F2** to use the drives as configured and lose all the data on them. |

*** The 1788 error message might also be displayed inadvertently due to a bad power cable connection to the drive, noise on the data cable, or a defective SCSI cable. If this message was due to a bad power cable connection, but not incorrect drive replacement, repair the connection and press **F2.** If the message is not eliminated by pressing **F2,** run Array Diagnostic Utility (ADU) to resolve.

-Dr-

If this message was not due to a bad power cable connection, and no drive replacement took place, this could indicate noise on the data cable. Check cable for proper routing.

-Dr-

If this message is due to a defective SCSI cable, replace the cable.

*continued*

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1789-Slot *X* Drive Array SCSI Drive(s) Not Responding. Check cables or replace the following SCSI drives: SCSI Port *Y*: SCSI ID *Z*<br><br>Select F1 to continue – drive array will remain disabled.<br><br>Select F2 to failed drives that are not responding – Interim Recovery Mode will be enabled if configured for fault tolerance. | None | Cable or hard drive failure occurred. | 1. Check the cable connections.<br>2. If cables are connected, replace the drive.<br>3. If you do not want to replace the drives at this time, press **F2.** |
| 1790-Disk 0 Configuration Error | None | Hard drive error or wrong drive type detected. | Run the BIOS Setup Utility and Compaq Diagnostics and correct. Replace failed assembly as indicated. |
| 1791-Disk 1 Error | None | Hard drive error or wrong drive type detected. | Run the BIOS Setup Utility and Compaq Diagnostics and correct. Replace failed assembly as indicated. |
| 1792-Drive Array Reports Valid Data Found in Array Accelerator.<br><br>Data will automatically be written to drive array. | None | This error indicates that while the system was in use, power was interrupted while data was in the array accelerator memory. Power was then restored within 8 to 10 days, and the data in the array accelerator was flushed to the drive array. | No action necessary; no data has been lost. Perform orderly system shutdowns to avoid data remaining in the array accelerator. |
| 1792-Secondary Disk Controller Failure | None | Part of the IDE drive electronics has failed. | Run Compaq Diagnostics and replace failed assembly as indicated. |
| 1793-Secondary Controller or Disk Failure | None | The IDE controller or an attached drive has failed. | Run Compaq Diagnostics and replace failed assembly as indicated. |

*continued*

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1793-Drive Array – Array Accelerator Battery Depleted – Data Lost.<br>(Error message 1794 also displays.) | None | This error indicates that while the system was in use, power was interrupted while data was in the array accelerator memory.<br>Array accelerator batteries failed. Data in array accelerator has been lost. | Power was not restored within 8 to 10 days. Perform orderly system shutdowns to avoid data remaining in the array accelerator. |
| 1794-Drive Array – Array Accelerator Battery Charge Low.<br>Array Accelerator is temporarily disabled.<br>Array Accelerator will be re-enabled when battery reaches full charge. | None | Warning that the battery charge is below 75%. Posted writes are disabled. | Replace the array accelerator board if batteries do not recharge within 36 power-on hours. |
| 1795-Drive Array – Array Accelerator Configuration Error.<br>Data does not correspond to this drive array. Array Accelerator is temporarily disabled. | None | This error indicates that while the system was in use, power was interrupted while data was in the array accelerator memory.<br>The data stored in the array accelerator does not correspond to this drive array. | Match the array accelerator to the correct drive array, or run the BIOS Setup Utility to clear the data in the array accelerator |
| 1796-Drive Array – Array Accelerator Not Responding.<br>Array Accelerator is temporarily disabled. | None | Array accelerator is defective or has been removed. | 1. Check that the array accelerator is properly seated.<br>2. Run the BIOS Setup Utility to reconfigure the Compaq IDA-2 without the array accelerator. |

*continued*

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**Table 3-2**
**POST Error Messages** *continued*

| Error Code | Audible Beeps | Probable Source of Problem | Action |
|---|---|---|---|
| 1797-Drive Array – Array Accelerator Read Error Occurred.<br>Data in Array Accelerator has been lost.<br>Array Accelerator is disabled. | None | Hard parity error detected while reading data from posted-writes memory. | Enable array accelerator. |
| 1798-Drive Array – Array Accelerator Write Error Occurred.<br>Array Accelerator is disabled. | None | Hard parity error detected while writing data to posted-writes memory. | Enable array accelerator. |
| 1799-Drive Array – Drive(s) Disabled due to Array Accelerator Data Loss.<br>Select "F1" to continue with logical drives disabled.<br>Select "F2" to accept data loss and to re-enable logical drives. | None | Volume failed due to loss of data in posted-writes memory. | Press **F1** to continue with logical drives disabled or **F2** to accept data loss, and then re-enable logical drives. |
| 1800-Temperature Alert | None | System has exceeded allowable temperature thresholds. | 1. Power down the system and allow it to cool.<br>2. Check fans for proper airflow and obstructions.<br>3. Check fans for proper operation.<br>4. Analyze ambient temperature in which the server is currently operating, and compare to user documentation recommendations.<br>5. Adjust as needed before restarting the server. |
| 1801-Microcode patch error | None | Missing or invalid processor microcode patch. | Contact Compaq authorized personnel for a new RDM. |

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# Diagnostics Software

Test error codes tables include all test error codes generated by Compaq products. Each code has a corresponding description and recommended action or actions. Each system generates only those codes that apply to its configuration and options.

When you run Diagnostics and Utilities from the BIOS Setup Utility main menu, the utility prompts you to test, inspect, upgrade, and diagnose the server.

Diagnostics and Utilities are located on the Compaq SmartStart and Support Software CD and must be accessed when a system configuration error is detected during the POST. Create a Diagnostics diskette from the SmartStart and Support Software CD and run Diagnostics from diskette. See the procedure in the "Running Compaq Utilities" section earlier in this chapter.

The following options are available from tbe Diagnostics and Utilities menu:

- Test Computer
- Inspect Computer
- Upgrade Firmware
- Remote Utilities
- Diagnose Drive Array

Diagnostic error codes are generated when the Diagnostics software recognizes a problem. These error codes help identify possible defective subassemblies.

## Steps for Diagnostics

In each case, the "Recommended Action" column lists the steps necessary to correct the problem. After completing each step, run the Diagnostics utility to verify that the error condition has been corrected. If the error code recurs:

1. Perform the next step listed in the table.
2. Run the Diagnostics utility again.
3. Follow this procedure until the Diagnostics utility no longer detects an error condition.

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## 100 – 199, Primary Processor Test Error Codes

The 100 series of diagnostic error codes identifies failures with processor and system board functions.

**Table 3-3**
**Primary Processor Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 101-*XX* | CPU test failed. | 1. Replace the processor and retest.<br>2. Replace the system board and retest |
| 103-*XX* | DMA page registers test failed. | Replace the system board and retest. |
| 104-*XX* | Interrupt controller master test failed. | |
| 105-*XX* | Port 61 error occurred. | |
| 106-*XX* | Keyboard controller self-test failed. | |
| 107-*XX* | CMOS RAM test failed. | 1. Replace the battery/clock module and retest. |
| 108-*XX* | CMOS interrupt test failed. | 2. Replace the system board and retest. |
| 109-*XX* | CMOS clock load data test failed. | |
| 110-*XX* | Programmable timer load data test failed. | Replace the system board and retest |
| 111-*XX* | Refresh detect test failed. | |
| 112-*XX* | Speed test slow mode out of range. | |
| 113-*XX* | Protected mode test failed | |
| 114-*XX* | Speaker test failed. | 1. Verify the speaker connection and retest.<br>2. Replace the speaker and retest.<br>3. Replace the system board and retest. |
| 116-*XX* | Cache test failed | Replace the processor and retest. |
| 122-*XX* | Multiprocessor dispatch test failed. | 1. Check the system configuration and retest.<br>2. Replace the processor and retest. |
| 123-*XX* | Interprocessor communication test failed. | 3. Replace the system board and retest |
| 199-*XX* | Installed devices test failed. | 1. Check the system configuration and retest.<br>2. Verify cable connections and retest.<br>3. Check switch or jumper settings, or both, and retest.<br>4. Run the BIOS Setup Utility and retest.<br>5. Replace the processor and retest.<br>6. Replace the system board and retest |

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## 200 – 299, Memory Test Error Codes

The 200 series of diagnostic error codes identifies failures with the memory subsystem.

**Table 3-4**
**Memory Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 200-*XX* | Invalid memory configuration. | Reinsert memory modules in correct location and retest. |
| 201-*XX*<br>202-*XX* | Memory machine ID test failed.<br>Memory system ROM checksum failed. | 1. Replace the system ROM and retest.<br>2. Replace the processor and retest.<br>3. Replace the system board and retest |
| 203-*XX*<br>204-*XX*<br>205-*XX*<br>206-*XX* | Memory write/read test failed.<br>Memory address test failed.<br>Walking I/O test failed.<br>Increment pattern test failed. | 1. Replace the memory module and retest.<br>2. Replace the processor and retest.<br>3. Replace the system board and retest. |
| 207-*XX* | Invalid memory configuration-check memory module installation. Memory modules installed have 8K refresh. | Replace memory modules. |
| 208-*XX* | Invalid memory speed detected – check DIMM installation. Slow memory modules may cause data loss. | Replace memory modules with timing greater than 60 ns. |
| 210-*XX* | Random pattern test failed. | 1. Replace the memory module and retest.<br>2. Replace the processor and retest.<br>3. Replace the processor board and retest. |

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## 300 – 399, Keyboard Test Error Codes

The 300 series of diagnostic error codes identifies failures with keyboard and system board functions.

**Table 3-5**
**Keyboard Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 301-*XX* | Keyboard short test, 8042 self-test failed. | 1. Check the keyboard connection. If disconnected, power down the computer, connect the keyboard, power up the computer, and retest.<br>2. Replace the keyboard and retest.<br>3. Replace the system board and retest |
| 302-*XX* | Keyboard long test failed. | |
| 303-*XX* | Keyboard LED test, 8042 self-test failed. | |
| 304-*XX* | Keyboard typematic test failed. | |

## 400 – 499, Parallel Printer Test Error Codes

The 400 series of diagnostic error codes identifies failures with the parallel printer interface or system board functions.

**Table 3-6**
**Parallel Printer Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 401-*XX* | Printer failed or not connected. | 1. Connect the printer and retest. |
| 402-*XX* | Printer data register failed. | 2. Check the power to the printer and retest. |
| 403-*XX* | Printer pattern test failed. | 3. Install the loopback connector and retest. |
| 498-*XX* | Printer failed or not connected. | 4. Check the switch on the serial/parallel interface board (if applicable) and retest.<br>5. Replace the serial/parallel interface board (if applicable) and retest.<br>6. Replace the system board and retest |

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## 500 – 599, Video Display Unit Test Error Codes

The 500 series of diagnostic error codes identifies failures with video or system board functions.

**Table 3-7**
**Video Display Unit Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 501-*XX* | Video controller test failed. | 1. Replace the monitor and retest. |
| 502-*XX* | Video memory test failed. | 2. Replace the Server Feature Board and retest. |
| 503-*XX* | Video attribute test failed. | 3. Replace the system board and retest |
| 504-*XX* | Video character set test failed. | |
| 505-*XX* | Video 80x25-mode 9x14 character cell test failed. | |
| 506-*XX* | Video 80x25-mode 8x8 character cell test failed. | |
| 507-*XX* | Video 40x25-mode test failed. | |
| 508-*XX* | Video 320x200-mode color set 0 test failed. | |
| 509-*XX* | Video 320x200-mode color set 1 test failed. | |
| 510-*XX* | Video 640x200-mode test failed. | |
| 511-*XX* | Video screen memory page test failed. | |
| 512-*XX* | Video gray scale test failed. | |
| 514-*XX* | Video white screen test failed. | |
| 516-*XX* | Video noise pattern test failed. | |

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## 600 – 699, Diskette Drive Test Error Codes

The 600 series of diagnostic error codes identifies failures with diskette, diskette drive, or system board functions.

**Table 3-8**
**Diskette Drive Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 600-*XX* | Diskette ID drive types test failed. | 1. Replace the diskette and retest.<br>2. Check the diskette power and signal cables. Replace if necessary and retest<br>3. Replace the diskette drive and retest.<br>4. Replace the system board and retest |
| 601-*XX* | Diskette format failed. | |
| 602-*XX* | Diskette read test failed. | |
| 603-*XX* | Diskette write/read/compute test failed. | |
| 604-*XX* | Diskette random seek test failed. | |
| 605-*XX* | Diskette ID media failed. | |
| 606-*XX* | Diskette speed test failed. | |
| 607-*XX* | Diskette wrap test failed. | |
| 608-*XX* | Diskette write protect test failed. | |
| 609-*XX* | Diskette reset controller test failed. | |
| 610-*XX* | Diskette change line test failed. | |
| 694-*XX* | Pin 34 is not cut on 360-KB diskette drive. | |
| 697-*XX* | Diskette type error. | |
| 698-*XX* | Diskette drive speed not within limits. | |
| 699-*XX* | Diskette drive/media ID error. | 1. Replace the media and retest<br>2. Run the BIOS Setup Utility and retest. |

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## 800 – 899, Video Board Test Error Codes

The 800 series of diagnostic error codes identifies failures with video boards or system board functions.

**Table 3-9**
**Video Board Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 802-*XX* | Video memory test failed. | 1. Replace monitor and retest. |
| 824-*XX* | Video text mode test failed. | 2. Replace the Server Feature Board and retest. |
| | | 3. Replace the system board and retest |

## 1100 – 1199, Serial Test Error Codes

The 1100 series of diagnostic error codes identifies failures with serial/parallel interface board or system board functions.

**Table 3-10**
**Serial Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 1101-*XX* | Serial port test failed. | 1. Check the switch settings on the serial/parallel interface board (if applicable) and retest. |
| 1109-*XX* | Clock register test failed. | 2. Replace the serial/parallel interface board (if applicable) and retest. |
| | | 3. Replace the system board and retest |

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## 1200 – 1299, Modem Communications Test Error Codes

The 1200 series of diagnostic error codes identifies failures with the modem.

**Table 3-11**
**Modem Communications Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 1201-*XX* | Modem internal loopback test failed. | 1. Refer to the modem documentation for correct setup procedures and retest. |
| 1202-*XX* | Modem time-out test failed. | 2. Check the modem line and retest. |
| 1203-*XX* | Modem external termination test failed. | 3. Replace the modem and retest. |
| 1204-*XX* | Modem auto originate test failed. | |
| 1206-*XX* | Dial multifrequency tone test failed. | |
| 1210-*XX* | Modem direct connect test failed. | |

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## 1700 – 1799, Hard Drive Test Error Codes

The 1700 series of diagnostic error codes identifies failures with hard drives, hard drive controller boards, hard drive cabling, and system board functions. If the system uses a drive array controller, see the "Array Diagnostic Utility (ADU)" section of this chapter.

**Table 3-12**
**Hard Drive Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 1700-*XX* | Hard drive ID drive types test failed. | 1. Ensure that the hard drive signal and power cables are seated properly and retest.<br>2. Replace the hard drive signal and power cables and retest.<br>3. Replace the hard drive data cable and retest<br>4. Replace the hard drive and retest<br>5. Replace the Server Feature Board and retest.<br>6. Replace the system board and retest |
| 1701-*XX* | Hard drive format test failed. | |
| 1702-*XX* | Hard drive read test failed. | |
| 1703-*XX* | Hard drive write/read/compare test failed. | |
| 1704-*XX* | Hard drive random seek test failed. | |
| 1705-*XX* | Hard drive controller test failed. | |
| 1708-*XX* | Hard drive format bad track test failed. | |
| 1709-*XX* | Hard drive reset controller test failed. | |
| 1710-*XX* | Hard drive park head test failed. | |
| 1715-*XX* | Hard drive head select test failed. | |
| 1716-*XX* | Hard drive conditional format test failed. | |
| 1717-*XX* | Hard drive ECC (error checking and correcting) test failed. | |
| 1719-*XX* | Hard drive power mode test failed. | |
| 1736-*XX* | Drive monitoring failed. | |
| 1799-*XX* | Invalid hard drive type failed. | |

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## 1900 – 1999, Tape Drive Test Error Codes

The 1900 series of diagnostic error codes identifies failures with tape cartridges, tape drives, tape drive cabling, adapter boards, or the Server Feature Board assembly.

**Table 3-13**
**Tape Drive Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 1900-*XX* | Tape ID failed. | 1. Replace the tape cartridge and retest |
| 1901-*XX* | Tape servo write failed. | 2. Check the signal cable, replace if necessary, and retest |
| 1902-*XX* | Tape format failed. | 3. Check the switch settings on the adapter board (if applicable) |
| 1903-*XX* | Tape drive sensor test failed. | 4. Replace the tape adapter board (if applicable) and retest. |
| 1904-*XX* | Tape BOT/EOT test failed. | 5. Replace the tape drive and retest |
| 1905-*XX* | Tape read test failed. | 6. Replace the Server Feature Board and retest. |
| 1906-*XX* | Tape write/read/compare test failed. | |

## 2400 – 2499, Advanced VGA Board Test Error Codes

The 2400 series of diagnostic error codes identifies failures with video boards, monitors, or the Server Feature Board assembly.

**Table 3-14**
**Advanced VGA Board Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 2402-*XX* | Video memory test failed. | 1. Run the BIOS Setup Utility |
| 2403-*XX* | Video attribute test failed. | 2. Replace the monitor and retest. |
| 2404-*XX* | Video character set test failed | 3. Replace the Server Feature Board or other video and retest. |
| 2405-*XX* | Video 80x25 mode 9x14 character cell test failed. | |
| 2406-*XX* | Video 80x25 mode 8x8 character cell test failed. | |
| 2407-*XX* | Video 40x25 mode test failed. | |
| 2408-*XX* | Video 320x320 mode color set 0 test failed. | |
| 2409-*XX* | Video 320x320 mode color set 1 test failed. | |

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**Table 3-14**
**Advanced VGA Board Test Error Codes** *continued*

| Error Code | Description | Recommended Action |
|---|---|---|
| 2410-*XX* | Video 640x200 mode test failed. | 1. Run the BIOS Setup Utility<br>2. Replace the monitor and retest.<br>3. Replace the Advanced VGA board or other video board and retest.<br>4. Replace the Server Feature Board and retest. |
| 2411-*XX* | Video screen memory page test failed. | |
| 2412-*XX* | Video gray scale test failed. | |
| 2414-*XX* | Video white screen test failed. | |
| 2416-*XX* | Video noise pattern test failed. | |
| 2417-*XX* | Lightpen text mode test failed, no response. | |
| 2418-*XX* | ECG/VGC memory test failed. | |
| 2419-*XX* | ECG/VGC ROM checksum test failed. | |
| 2420-*XX* | ECG/VGC attribute test failed. | |
| 2421-*XX* | ECG/VGC 640x200 graphics mode test failed. | |
| 2422-*XX* | ECG/VGC 640x350 16-color set test failed. | |
| 2423-*XX* | ECG/VGC 640x350 64-color test failed. | |
| 2424-*XX* | ECG/VGC monochrome text mode test failed. | |
| 2425-*XX* | ECG/VGC monochrome graphics mode test failed. | |
| 2431-*XX* | 640x480 graphics test failure. | |
| 2432-*XX* | 320x200 graphics (256-color mode) test failure. | |
| 2448-*XX* | Advanced VGA controller test failed. | |
| 2451-*XX* | 132-column Advanced VGA test failed. | |
| 2456-*XX* | Advanced VGA 256-color test failed. | |
| 2458-*XX* | Advanced VGA bit BLT test. | 1. Run Setup.<br>2. Replace the Server Feature Board and retest. |
| 2468-*XX* | Advanced VGA DAC test | |
| 2477-*XX* | Advanced VGA data path test. | |
| 2480-*XX* | Advanced VGA DAC test | |

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## 6500 – 6599, SCSI Hard Drive Test Error Codes

The 6500 series of diagnostic error codes identifies failures with SCSI hard drives, SCSI hard drive controller boards, SCSI hard drive cabling, and system board functions. If the system uses a drive array controller, see the section for "Array Diagnostic Utility (ADU)" in this chapter.

**Table 3-15**
**SCSI Hard Drive Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 6500-*XX* | SCSI disk ID drive types test failed. | 1. Replace the SCSI disk drive data cable and retest. |
| 6502-*XX* | SCSI disk unconditional format test failed. | 2. Replace the SCSI controller and retest. |
| 6505-*XX* | SCSI disk read test failed. | 3. Replace the SCSI disk drive and retest. |
| 6506-*XX* | SCSI disk SA/media test failed. | 4. Replace the Server Feature Board and retest. |
| 6509-*XX* | SCSI disk erase tape test failed. | |
| 6523-*XX* | SCSI disk random read test failed. | |
| 6528-*XX* | Media load/unload test failed. | |

## 6600 – 6699, SCSI/IDE CD-ROM Drive Test Error Codes

The 6600 series of diagnostic error codes identifies failures with the CD-ROM drive cabling, CD-ROM drives, adapter boards, or the system board assembly.

**Table 3-16**
**SCSI/IDE CD-ROM Drive Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 6600-*XX* | CD-ROM ID failed. | 1. Replace the CD-ROM media and retest. |
| 6605-*XX* | CD-ROM read failed. | 2. Check the signal cable, replace if necessary, and retest |
| | | 3. Check the switch settings on the adapter board (if applicable) |
| | | 4. Replace the CD-ROM drive and retest. |
| | | 5. Replace the system board and retest. |

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## 6700 – 6799, SCSI Tape Drive Test Error Codes

The 6700 series of diagnostic error codes identifies failures with tape cartridges, tape drives, media changers, tape drive cabling, adapter boards, or the Server Feature Board assembly

**Table 3-17**
**SCSI Tape Drive Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 6700-*XX* | SCSI tape ID drive types test failed. | 1. Replace the SCSI tape drive signal and power cables, and retest. |
| 6706-*XX* | SCSI disk SA/media test failed. | 2. Replace the SCSI controller and retest. |
| 6709-*XX* | SCSI disk erase tape test failed. | 3. Replace the SCSI tape drive and retest. |
| 6728-*XX* | Media load/unload test failed. | 4. Replace the Server Feature Board and retest. |

## 8600 – 8699, Pointing Device Interface Test Error Codes

The 8600 series of diagnostic error codes identifies failures with the pointing device (mouse, trackball, and so on) or the system board assembly.

**Table 3-18**
**Pointing Device Interface Test Error Codes**

| Error Code | Description | Recommended Action |
|---|---|---|
| 8601-*XX* | Pointing device interface test failed. | 1. Replace with a working pointing device and retest. |
| | | 2. Replace the system board and retest. |

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# Array Diagnostic Utility (ADU)

The Array Diagnostic Utility (ADU) is a Windows-based software tool designed to run on all Compaq servers that support Compaq array controllers installed with SmartStart 4.10 or later. The two main functions of ADU are to collect all possible information about array controllers in the system and to generate a list of detected problems. The error messages and codes listed include all codes generated by Compaq products. The system generates only codes applicable to the configuration and options in the server.

ADU works by issuing multiple commands to the array controllers to determine if a problem exists. This data can then be saved to a file. In severe situations, this file can be sent to Compaq for analysis. In most cases, ADU provides enough information to initiate problem resolution immediately.

**NOTE:** ADU does not write to the drives, destroy data, or change or remove configuration information.

## Starting ADU

1. Insert the Compaq SmartStart and Support Software CD into the CD-ROM drive.
2. Restart the system from the SmartStart and Support Software CD.
3. Select Array Diagnostic Utility (ADU) from the System Utilities menu.
4. A "Please Wait" panel displays, indicating that ADU is identifying the system parameters. ADU gathers information from all of the array controllers in the system. The time it takes to gather this information depends on the size of the system.
5. When the information gathering process is complete, ADU displays the main screen or a panel indicating any problems detected.

**CAUTION:** Do not cycle the power during this process. ADU must perform low-level operations that, if interrupted, could cause the controller to revert to a previous level of firmware if the firmware was soft-upgraded.

6. To generate an ADU report, select File, and then Save Data from the Command menu.

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## ADU Diagnostic Messages

**Table 3-19**
**ADU Diagnostic Messages**

| Message | Description | Recommended Action |
|---|---|---|
| Accelerator board not detected | Array controller did not detect a configured array accelerator board. | Install the array accelerator board on the array controller. If an array accelerator board is already installed, check for proper seating on the array controller board. |
| Accelerator error log | List of the last 32 parity errors on transfers to or from memory on the array accelerator board; displays starting memory address, transfer count, and operation (read and write). | If there are many parity errors, you may need to replace the array accelerator board. |
| Accelerator parity read errors: *X* | Number of times that read memory parity errors were detected during transfers from memory on array accelerator board. | If there are many parity errors, you may need to replace the array accelerator board. |
| Accelerator parity write errors: *X* | Number of times that write memory parity errors were detected during transfers to memory on the array accelerator board. | If there are many parity errors, you may need to replace the array accelerator board. |
| Accelerator status: Cache was automatically configured during last controller reset | This message can occur when cache board is replaced with one of a different size. | Normal operations should continue. |
| Accelerator status: Data in the cache was lost due to some reason other than the battery being discharged | Data in the cache was lost, but not because of the battery being discharged. | Ensure that the array accelerator is properly seated. If the error continues, you may need to replace the array accelerator. |
| Accelerator status: Dirty data detected has reached limit. Cache still enabled, but writes no longer being posted | The number of cache lines containing dirty data that cannot be flushed (written) to the drives has reached a preset limit. The cache is still enabled, but writes are no longer being posted. This error usually occurs when there is a problem with the drive or drives. | Resolve problem with drive or drives. The controller is then able to write dirty data to drives, and posted-writes operations are restored. |
| Accelerator status: Dirty data detected. Unable to write dirty data to drives | At least one cache line contains dirty data that the controller has been unable to flush (write) to the drives. This problem usually occurs when there is a problem with the drive or drives. | Resolve the problem with the drive or drives. The controller is then able to write dirty data to drives. |

*continued*

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**Table 3-19**
**ADU Diagnostic Messages** *continued*

| Message | Description | Recommended Action |
|---|---|---|
| Accelerator status: Excessive ECC errors detected in at least one cache line. As a result, at least one cache line is no longer in use | At least one line in the cache is no longer in use due to excessive ECC errors detected during use of the memory associated with that cache line. | Consider replacing the cache. If cache replacement is not done, remaining cache lines should continue to operate properly. |
| Accelerator status: Obsolete data detected | During reset initialization, obsolete data was found in cache. This was due to drives being moved and written to by another controller. | Normal operations should continue. The controller either writes data to the drives or discards the data completely. |
| Accelerator status: Obsolete data was discarded | During reset initialization, obsolete data was found in cache and was discarded (not written to drives). | Normal operations should continue. |
| Accelerator status: Obsolete data was flushed (written) to drives | During reset initialization obsolete data was found in cache. Obsolete data was written to the drives, but newer data may have been overwritten. | If newer data was overwritten, you may need to restore newer data; otherwise, normal operations should continue. |
| Accelerator status: Permanently disabled | Array accelerator board has been permanently disabled. It remains disabled until it is reinitialized using the Array Configuration Utility (ACU). | Check the Disable Code field. Run ACU to reinitialize the array accelerator board. |
| Accelerator status: Possible data loss in cache | Possible data loss detected during power-up due to all batteries being below sufficient voltage level and no presence of identification signatures on the array accelerator board. | There is no way to determine if dirty or bad data was in the cache and is now lost. |
| Accelerator status: Temporarily disabled | Array accelerator board has been temporarily disabled. | Check the Disable Code field. |
| Accelerator status: Unrecognized status | A status returned from the array accelerator board that ADU does not recognize. | Obtain the latest version of ADU. |
| Accelerator status: Valid data found at reset | Valid data was found in posted write memory at reinitialization. Data is then flushed to disk. | Not an error or data loss condition. No action required. |
| Accelerator status: Warranty alert | Catastrophic problem with array accelerator board. Refer to other messages on Diagnostics screen for exact meaning of this message. | Replace the array accelerator board. |

*continued*

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**Table 3-19**
**ADU Diagnostic Messages** *continued*

| Message | Description | Recommended Action |
|---|---|---|
| Adapter/NVRAM ID mismatch | EISA nonvolatile RAM has an ID for a different controller from the one physically present in the slot. | Run the BIOS Setup Utility. |
| Array accelerator battery pack *X* not fully charged | Battery is not fully charged. | If 75% of batteries present are fully charged, array accelerator is fully operational. If less than 75% of batteries are fully charged, allow 36 hours to recharge them. |
| Array accelerator battery pack *X* below reference voltage (recharging) | Battery pack on array accelerator is below required voltage levels. | Allow enough time for batteries to recharge (36 hours). If batteries have not recharged after 36 hours, replace the array accelerator board. |
| Board in use by expand operation | Array accelerator memory is in use by expand operation. | Operate system without array accelerator board until expand operation completes. |
| Board not attached | Array controller configured for use with array accelerator board, but one is not attached. | Attach array accelerator board to array controller. |
| Configuration signature is zero | ADU detected that nonvolatile RAM contains a configuration signature of zero. Old versions of the BIOS Setup Utility could cause this. | Run the latest version of BIOS Setup Utility to configure the controller and nonvolatile RAM. |
| Configuration signature mismatch | Array accelerator board configured for a different array controller board. Configuration signature on array accelerator board does not match the one stored on the array controller board. | To recognize the array accelerator board, run the ACU. |
| Controller communication failure occurred | Controller communication failure occurred. | ADU was unable to successfully issue commands to the controller in this slot. |
| Controller detected. NVRAM configuration not present | EISA nonvolatile RAM does not contain a configuration for this controller. | Run the BIOS Setup Utility to configure the nonvolatile RAM. |
| Controller firmware needs upgrading | Controller firmware is below the latest recommended version. | Run Options ROMPaq to upgrade the controller to the latest firmware revision. |
| Controller is located in special "video" slot | Controller is installed in slot for special video control signals. If controller is used in this slot, LED indicators on front panel may not function properly. | Install the controller in a different slot, and run the BIOS Setup Utility to configure the controller and nonvolatile RAM. Then run the ACU to configure controller. |

*continued*

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**Table 3-19**
**ADU Diagnostic Messages** *continued*

| Message | Description | Recommended Action |
|---|---|---|
| Controller is not configured | Controller is not configured. If controller was previously configured and you change drive locations, there may be a problem with placement of the drives. ADU examines each physical drive and looks for drives that have been moved to a different drive bay. | Look for messages indicating which drives have been moved. If none display and drive swapping did not occur, run the ACU to configure the controller and run the BIDS Setup Utility to configure nonvolatile RAM. **Do not** run either utility if you believe drive swapping has occurred |
| Controller reported PDST error. Error Code:*X* | The controller returned an error from its internal Power-On Self-Tests (PDSTs). | Replace the controller |
| Controller restarted with a signature of zero | ADU did not find a valid configuration signature to use to get the data. Nonvolatile RAM may not be present (unconfigured) or the signature present in nonvolatile RAM may not match the signature on the controller. | Run the BIDS Setup Utility to configure the controller and nonvolatile RAM. |
| Disable command issued | Posted-writes have been disabled by the issuing of the Accelerator Disable command. This message occurred because of an operating system device driver. | Restart the system. Run the ACU Utility to reinitialize the array accelerator board. |
| Drive (bay) *X* firmware needs upgrading | Firmware on this physical drive is below the latest recommended version. | Run the Options ROMPaq Utility to upgrade the drive firmware to the latest revision. |
| Drive (bay) *X* has insufficient capacity for its configuration | Drive has insufficient capacity to be used in this logical drive configuration. | Replace this drive with a larger capacity drive. |
| Drive (bay) *X* has invalid M&P stamp | Physical drive has invalid monitor and performance data. | Run the BIDS Setup Utility to properly initialize this drive. |
| Drive (bay) *X* has loose cable | The array controller could not communicate with this drive at power-up. This drive has not previously failed. | Check all cable connections first. The cables could be bad, loose, or disconnected. Power up the system and attempt to reconnect signal/power cable to the drive. If still not successful, replace the cable. If that does not work, the drive may need to be replaced. |
| Drive (bay) *X* is a replacement drive | This drive has been replaced. This message displays if a drive is replaced in a fault tolerant logical volume. | If the replacement was intentional, allow the drive to rebuild. |

*continued*

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**Table 3-19**
**ADU Diagnostic Messages** *continued*

| Message | Description | Recommended Action |
|---|---|---|
| Drive (bay) *X* is a replacement drive marked OK | This drive has been replaced and marked OK by the firmware. This may occur if a drive has an intermittent failure (for example, if a drive has previously failed, then starts working again when ADU is run. | Replace the drive. |
| Drive (bay) *X* is failed | The indicated physical drive has failed. | Replace the drive. |
| Drive (bay) *X* is undergoing drive recovery | This drive is being rebuilt from the corresponding mirror or parity data. | Normal operations should occur. |
| Drive (bay) *X* needs replacing | The 210-MB hard drive has firmware version 2.30 or 2.31. | Replace the drive. |
| Drive (bay) *X* upload code not readable | An error occurred while ADU was trying to read the upload code information from this drive. | If there were multiple errors, this drive may need to be replaced. |
| Drive (bay) *X* was inadvertently replaced | The physical drive was incorrectly replaced after another drive failed | 1. Replace the drive that was incorrectly replaced.<br>2. Replace the original drive that failed.<br>Do not run the BIOS Setup Utility and try to reconfigure; data will be lost. |
| Drive Monitoring features are unobtainable | ADU unable to get monitor and performance data due to fatal command problem (such as drive time-out), or unable to get data due to these features not being supported on the controller. | Check for other errors such as time-outs. If no other errors occur, upgrade the firmware to a version that supports monitor and performance, if desired. |
| Drive Monitoring is NOT enabled for SCSI Port *X* Drive ID *X* | The monitor and performance features have not been enabled on this drive. | Run the BIOS Setup Utility to initialize the monitor and performance features. |
| Drive time-out occurred on physical drive bay *X* | ADU issued a command to a physical drive and the command was never acknowledged. | The drive or cable may be bad. Check the other error messages on the Diagnostics screen to determine resolution. |
| Drive *X* indicates position *Y* | Message indicates physical drive that seems to be scrambled or in a drive bay other than the one for which it was originally configured. | Examine the graphical drive representation on ADU to determine proper drive locations. Remove drive *X* and place it in drive position *Y*. Rearrange the drives according to the ADU instructions |
| Duplicate write memory error | Data could not be written to the array accelerator board in duplicate due to the detection of parity errors. This error is not a data loss situation. | Replace the array accelerator board. |

*continued*

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**Table 3-19**
**ADU Diagnostic Messages** *continued*

| Message | Description | Recommended Action |
|---|---|---|
| Error occurred reading RIS copy from SCSI Port *X* Drive ID *X* | An error occurred while ADU was trying to read the RIS from this drive. | If there were multiple errors, this drive may need to be replaced. |
| FYI: Drive (bay) *X* is non-Compaq supplied | The installed drive was not supplied by Compaq. | If problems exist with this drive, replace it with a Compaq drive. |
| Identify controller data did not match with NVRAM | The identify controller data from the array controller did not match the information stored in nonvolatile RAM. This could occur if new, previously configured drives have been placed in a system that has also been previously configured. It could also occur if the firmware on the controller has been upgraded and the BIOS Setup Utility was not run. | Check the identify controller data under the Inspect Utility. If the firmware version field is the only difference between the controller and nonvolatile RAM data, this is not a problem. Otherwise, run the BIOS Setup Utility. |
| Identify logical drive data did not match with NVRAM | The identify unit data from the array controller did not match with the information stored in nonvolatile RAM. This could occur if new, previously configured drives have been placed in a system that has also been previously configured. | Run the BIOS Setup Utility to configure the controller and nonvolatile RAM. |
| Insufficient adapter resources | The adapter does not have sufficient resources to perform operations to the array accelerator board. Drive rebuild may be occurring. | Operate the system without the array accelerator board until the drive rebuild completes. |
| Less than 75% batteries at sufficient voltage | Operation of array accelerator board has been disabled due to less than 75% of battery packs being at sufficient voltage level. | Allow sufficient time for batteries to recharge (36 hours). If batteries have not recharged after 36 hours, replace the array accelerator board. |
| Less than 75% batteries at sufficient voltage. Battery pack *X* below reference voltage. | Battery pack on array accelerator is below required voltage levels. | Allow sufficient time for batteries to recharge (36 hours). If batteries have not recharged after 36 hours, replace the array accelerator board. |
| Logical drive *X* failed due to cache error | This logical drive failed due to a catastrophic cache error. | Replace the array accelerator board and reconfigure using the ACU. |

*continued*

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**Table 3-19**
**ADU Diagnostic Messages** *continued*

| Message | Description | Recommended Action |
|---|---|---|
| Logical Drive *X* status = FAILED | This status could be issued for several reasons:<br>■ Logical drive is configured for No Fault Tolerance and one or more drives fail.<br>■ Mirroring is enabled, and any two mirrored drives fail.<br>■ Data Guarding is enabled, and two or more drives fail.<br>■ Another configured logical drive is in the WRONG DRIVE REPLACED or LOOSE CABLE DETECTED state. | Check for drive failures, wrong drive replaced, or loose cable messages. If there was a drive failure, replace the failed drive(s), then restore the data for this logical drive from the tape backup. Otherwise, follow the wrong drive replaced or loose cable detected procedures. |
| Logical Drive *X* status = INTERIM RECOVERY | A physical drive in this logical drive has failed. The logical drive is operating in interim recovery mode and is vulnerable. | Replace the failed drive as soon as possible. |
| Logical Drive *X* status = LOOSE CABLE DETECTED | A physical drive has a cabling problem. | Power down the system and attempt to reattach the cable onto the drive. If this does not work, replace the cable. |
| Logical Drive *X* status = NEEDS RECOVER | A physical drive in this logical drive has failed and has been replaced. The replacement drive needs to be rebuilt from the mirror drive or the parity data. | When starting the system, select the "**F1** – rebuild drive" option to rebuild the replaced drive. |
| Logical Drive *X* status = OVERHEATED | The temperature of the Intelligent Array Expansion System is beyond safe operating levels, and the system has shut down to avoid damage. | Check the fans and the operating environment. |
| Logical Drive *X* status = OVERHEATING | The Intelligent Array Expansion System temperature is beyond safe operating levels. | Check the fans and the operating environment. |
| Logical Drive *X* status = RECOVERING | A physical drive in this logical drive has failed and has now been replaced. The replaced drive is rebuilding from the mirror drive or the parity data. | Nothing needs to be done. Normal operations can occur. |
| Logical Drive *X* status = WRONG DRIVE REPLACED | A physical drive in this logical drive has failed. The incorrect drive was replaced. | Replace the drive that was incorrectly replaced. Then, replace the original drive that failed with a new drive. Do not run the BIOS Setup Utility to reconfigure; data loss can occur. |

*continued*

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**Table 3-19**
**ADU Diagnostic Messages** *continued*

| Message | Description | Recommended Action |
|---|---|---|
| Loose cable detected – logical drives may be marked FAILED until corrected | ADU found loose cable. If logical drives are marked FAILED, those logical drives are unusable until problem is corrected. | Power down the system. Check cable for tight connection to logical drives. Restart system. If same message recurs, cable may be bad. |
| Loose cable detected – logical drives may be marked FAILED until corrected | Controller unable to communicate with one or more physical drives, probably because of a cabling problem. Logical drives may be in a FAILED state until the condition is corrected, preventing access to data on the controller. | Check all controller and drive cable connections. |
| Mirror data miscompare | Data was found at reinitialization in the posted-writes memory, however, the mirror data compare test failed, resulting in data being marked as invalid. Data loss is possible. | Replace the array accelerator board. |
| No configuration for accelerator board | The array accelerator board has not been configured. | If the array accelerator board is present, run the ACU to configure the board. |
| NVRAM configuration present, controller not detected | EISA nonvolatile RAM has a configuration for an array controller, but there is no board in this slot. Either a board has been removed from the system or a board has been placed in the wrong slot. | Place the array controller in the proper slot or run the BIOS Setup Utility to reconfigure nonvolatile RAM to reflect the removal or new position. |
| RIS copies between drives do not match | Drives on controller contain copies of RIS that do not match. | 1. Upgrade ADU to the most recent version.<br>2. If unconfigured drives were added, configure using ACU.<br>3. If drives or arrays were moved, make sure the movement adheres to the documentation guidelines for the array controller. |
| SCSI Port *X* Drive ID *X* has exceeded threshold(s) | Monitor and performance threshold for this drive has been violated. | Check for the particular threshold that has been violated and replace. |
| SCSI Port *X* Drive ID *X* is not stamped for monitoring | Drive has not been stamped with monitor and performance features. | Run the ACU. Changing the configuration and saving should cause ACU to stamp drive with monitor and performance features. To do this without destroying the current configuration, change array accelerator size and save configuration. Change the array accelerator back to original size and save again. |
| SCSI Port *X* Drive ID *X* RIS copy mismatch | Copies of RIS on drive do not match. | Drive may need to be replaced. Check for other errors. |

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**Table 3-19**
**ADU Diagnostic Messages** *continued*

| Message | Description | Recommended Action |
|---|---|---|
| SCSI Port *X* Drive ID *X* failed – REPLACE (failure message) | ADU found drive that needs to be replaced. | Replace drive or correct condition that caused error. |
| SCSI Port *X* Drive ID *X* firmware needs upgrading | Drive firmware is below recommended version. | Run Dptions RDMPaq to upgrade drive to latest firmware revision. |
| SCSI Port *X* Drive ID *X* has a loose cable. SMART is unable to communicate with drive | Drive has loose cable. | Power down the system. Check drive cable for tight connection. |
| SCSI Port *X* Drive ID *X* was replaced on a good volume (failure message) | ADU found drive was replaced even though volume was fine. | No action needed. |
| SCSI port *X*, drive ID *Y* firmware needs upgrading | Firmware on drive may cause problems and should be upgraded. | Run Dptions RDMPaq to upgrade the firmware on the drive to a later version. |
| Set configuration command issued | The configuration of the array controller has been updated. The array accelerator board may remain disabled until it is reinitialized. | Run the BIDS Setup Utility to reinitialize the array accelerator board. |
| Soft Firmware Upgrade required | ADU has determined that the controller is running firmware that has been soft upgraded by the Compaq Upgrade Utility. However, the firmware running is not present on all drives. This message could be caused by the addition of new drives in the system. | Run the Compaq Upgrade Utility to place the latest firmware on all drives. |
| Unable to communicate with drive on SCSI Port *X*, Drive ID *X* | Controller could not communicate with drive. | If the amber LED on the drive is on, replace the drive. |

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**Table 3-19**
**ADU Diagnostic Messages** *continued*

| Message | Description | Recommended Action |
|---|---|---|
| Unknown disable code | A code was returned from the array accelerator board that ADU does not recognize. | Obtain the latest version of ADU. |
| Unrecoverable read error | Read parity errors were detected when attempting to read same data from both sides of mirrored memory. Data loss can occur. | Replace the array accelerator board. |
| WARNING – Drive Write Cache is enabled on *X* | Drive has its internal write cache enabled. The drive may be a third-party drive, or the operating parameters of the drive may have been altered. This condition may cause data corruption if power to the drive is interrupted. | Replace the drive with a drive supplied by Compaq, or restore the operating parameters of the drive. |
| Warning bit detected | A monitor and performance threshold violation may have occurred. Status of a logical drive may not be OK | Check the other error messages on the diagnosis screen for an indication of the problem. |
| Write memory error | Data could not be written to cache memory. This typically means that parity error was detected while writing data to cache. This error could be caused by incomplete connection between cache and controller. This situation is not a data loss circumstance. | With the system powered down, verify that the cache board is fully connected to controller. |
| Wrong Accelerator | This message could mean that the board either was replaced in the wrong slot or placed in a system previously configured with another board type. Included with this message is a message indicating (1) type of adapter sensed by ADU, and (2) the type of adapter last configured in EISA nonvolatile RAM. | Check the diagnosis screen for other error messages. Run the BIOS Setup Utility to update the system configuration. |

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# Integrated Management Log (IML)

The Compaq Integrated Management Log (IML) replaces the Critical Error Log and Correctable Memory Logs. IML records system events and stores them in an easily viewable form. Each event is marked witb a time-stamp with one-minute granularity.

Events listed in the IML are categorized as one of four event severity levels:

- **Status**—indicates that the message is informational only.
- **Repaired**—indicates tbat corrective action bas been taken.
- **Caution**—indicates a nonfatal error condition.
- **Critical**—indicates a component failure.

The IML requires Compaq operating system-dependent drivers. Refer to the Compaq Support Software CD for instructions on installing the appropriate drivers.

## Multiple Ways of Viewing the IML

You can view an event in the IML in several ways:

- From within Compaq Insight Manager
- From within tbe Compaq Survey Utility
- From within the IML Management Utility
- From within the Compaq IML Viewers

### Compaq Insight Manager

Compaq Insight Manager is a comprehensive management tool used to monitor and control the operation of Compaq servers and clients. Compaq Insight Manager consists of two components: a Windows-based console application, and server- or client-based management data collection agents. Starting with Compaq Insigbt Manager 4.0, the agents for Windows NT and NetWare are also Web-enhanced; that is, these agents enable Web browser access and monitoring of management information.

The management agents monitor over 1,000 management parameters. Key subsystems are instrumented to make health, configuration, and performance data available to agent software. Agents act upon data by initiating information, sucb as statistics on network interface or storage subsystem performance.

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### Viewing the Event List

1. From Compaq Insight Manager, select tbe appropriate server, then select View Device Data. The selected server displays with buttons around its perimeter.
2. Select the Recovery button, and tben the Integrated Management Log.
3. If a failed component bas been replaced, select the event from the list, then select Mark Repaired.

### Printing the Event List

1. From the Compaq Insight Manager screen, select the appropriate server.
2. Select the Configuration button, then the Recovery button, and then Print.

### Compaq Survey Utility

The Compaq Survey Utility is a serviceability tool available on the SmartStart CD. It delivers online-configuration capture and comparison to maximize server availability. It is delivered on the Compaq Management CD in the SmartStart package or is available on the Compaq website. Refer to the Compaq Management CD for information on installing and running the Compaq Survey Utility.

After running the Compaq Survey Utility, view the IML by loading the output of the utility (typically called "survey.txt") into a text viewer such as Microsoft Notepad. The event list follows the system slot information. After opening the text file, print it using the print feature of the viewer.

### Compaq IML Viewer

Compaq provides IML Viewer utilities for Windows NT 4.x, Novell NetWare, SCO OpenServer 5.05, and SCO UnixWare 7. The OS-based tools give you the ability to review, mark corrected, save, clear, and print events (in some operating systems) from the IML. The utilities are located on the corresponding OS Support Software Diskette (SSD) or Extended Feature Supplement (EFS), shipped on the Compaq SmartStart and Support Software CD. Refer to the help files on the specific SSD/EFS for information on how to install and use the IML Viewer for your operating system.

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# Event List

The Event List displays the affected components and the associated error messages. Though the same basic information displays, the format of the list may differ, depending on how you view it—from within Compaq Insight Manager or the Compaq Survey Utility.

## Event Messages

**Table 3-20**
**Event Messages**

| Event Type | Event Message | Action |
|---|---|---|
| **Machine Environment** | | |
| Fan failure | System Fan Failure (Fan *X*, Location) | Replace fan. |
| Fan inserted | System Fan Inserted (Fan *X*, Location) | None |
| Fan removed | System Fan Removed (Fan *X*, Location) | None |
| Fans not redundant | System Fans Not Redundant | Add fan. |
| Overheat condition | System Overheating (Zone *X*, Location) | Check fans. |
| **Main Memory** | | |
| Correctable error threshold exceeded | Corrected Memory Error threshold passed (Slot *X*, Memory Module *X*) | Replace failed memory module. |
| | Corrected Memory Error threshold passed (System Memory) | Replace failed memory modules one at a time (if more than one) and retest the system after each replacement. |
| | Corrected Memory Error threshold passed (Memory Module unknown) | Replace failed memory modules one at a time (if more than one). |
| Uncorrectable error | Uncorrectable Memory Error (Slot *X*, Memory Module *X*) | Replace failed memory module. |
| | Uncorrectable Memory Error (System Memory) | Replace failed memory module. |
| | Uncorrectable Memory Error (Memory Module unknown) | Replace defective memory modules one at a time (if more than one) and retest the system after each replacement |

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**Table 3-20**
**Event Messages** *continued*

| Event Type | Event Message | Action |
|---|---|---|
| **Processor** | | |
| Correctable error threshold exceeded | Processor Correctable Error Threshold Passed (Slot *X*, Socket *X*) | Replace the processor. |
| Uncorrectable error | Unrecoverable Host Bus Data Parity Error | Replace the processor. |
| Host bus error | Unrecoverable Host Bus Address Parity Error | Call the Compaq authorized service provider or Compaq for diagnosis. |
| PCI bus error | PCI Bus Error (Slot *X*, Bus *X*, Device *X*, Function *X*) | Power down PCI slot and replace board. |
| **Power Subsystem** | | |
| Power supply failure | System Power Supply Failure (Power Supply *X*) | Replace power supply. |
| Power supply inserted | System Power Supply Inserted (Power Supply *X*) | None |
| Power supply removed | System Power Supply Removed (Power Supply *X*) | None |
| Power supply not redundant | System Power Supplies Not Redundant | Add power supply. |
| BIOS configuration battery low | Real-Time Clock Battery Failing | Replace battery. |
| Power module failure | A CPU Power Module (System Board, Socket *X*) | Replace power module |
| Power modules not redundant | System Power Modules Not Redundant | Add power module. |
| AC voltage problem | System AC Power Problem (Power Supply *X* | Check the input power voltage. |
| Power AC overload | System AC Power Overload (Power Supply *X*) | ■ Change the input power to 220V.<br>■ Add an additional power supply, or replace with one able to supply present load.<br>■ Reduce the load. |

*continued*

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**Table 3-20**
**Event Messages** *continued*

| Event Type | Event Message | Action |
|---|---|---|
| **Automatic Server Recovery** | | |
| System lockup | ASR Lockup Detected: Cause | Refer to the documentation or call the Compaq authorized service provider or Compaq for diagnosis. |
| **Operating System** | | |
| System lockup | Blue Screen Trap: Cause [NT]<br>Kernel Panic: Cause [UNIX]<br>Abnormal Program Termination: Cause [NetWare] | Refer to the documentation for the operating system. |
| Automatic OS shutdown | Automatic Operating System Shutdown Initiated Due to Fan Failure<br>Automatic Operating System Shutdown Initiated Due to Overheat Condition<br>Fatal Exception (Number *X*, Cause) | Refer to the documentation for the operating system. |

# Rapid Error Recovery

Compaq servers provide rapid recovery services for diagnosing and recovering from errors. These tools are available for local and remote diagnosis and recovery.

Rapid recovery means fast identification and resolution of complex faults. The Rapid Recovery Engine and Insight Management Agents notify the system administrator when a failure occurs, ensuring that the server experiences minimal downtime. These integrated server management features are:

- Automatic Server Recovery (ASR)
- ASR Integrated Management Log (IML) Messages
- Storage Fault Recovery Tracking
- Storage Automatic Reconstruction
- Network Interface Fault Recovery Tracking
- Memory Fault Recovery Tracking

These are discussed in more detail on the server documentation CD.

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## Automatic Server Recovery (ASR)

Automatic Server Recovery (ASR) lets the server automatically restart after a catastrophic operating system failure.

The available recovery features are:

- **Software Error Recovery**—automatically restarts the server after a software-induced server failure
- **Environmental Recovery**—allows the server to restart when temperature, fan, or AC power conditions return to normal

### Unattended Recovery

For unattended recovery, ASR performs the following actions:

- Logs the error information to the IML
- Resets the server
- Attempts to restart the operating system

Often the server restarts successfully, making unattended recovery the ideal choice for remote locations where trained service personnel are not immediately available. The Server Management Driver (the Health Driver) automatically enables ASR when the driver is loaded.

**Table 3-21**
**ASR Features**

| Feature | Definition |
|---|---|
| Software error recovery | When enabled, ASR is activated if the OS hangs or stops responding, resulting in a lockup. |
| Thermal shutdown | When enabled, shuts down the server if a critical thermal error occurs. |
| UPS shutdown | When enabled, allows the server to perform a shutdown if an uninterruptible power supply (UPS) is activated. |
| UPS shutdown threshold | Determines how long the server waits to shut down after the UPS is activated. If desired, this number should provide enough time for an administrator to perform any necessary operations or to properly shut down the server. |

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## Compaq Server Management Driver

The Compaq Server Management Driver resets the ASR timer continually. The timer is set to expire in 10 minutes. If the ASR timer counts down to zero before being reset due to an operating system crash or a server lockup, ASR restarts the server.

The Compaq Server Management Driver is independent of the ASR timer. Load the driver and enable the ASR timer, which allows the driver to detect and log information regarding numerous hardware and software errors. However, you cannot enable the ASR timer without loading the Compaq Server Management Driver. The Server Management Driver provides many benefits in addition to ASR, including ECC error detection, CPU processor memory, and hard drive prefailure support. Also, the Compaq Server Management Driver works with Compaq Insight Manager to provide a complete systems management solution.

The following ASR flowchart shows you the sequence of events after a hardware or software error occurs:

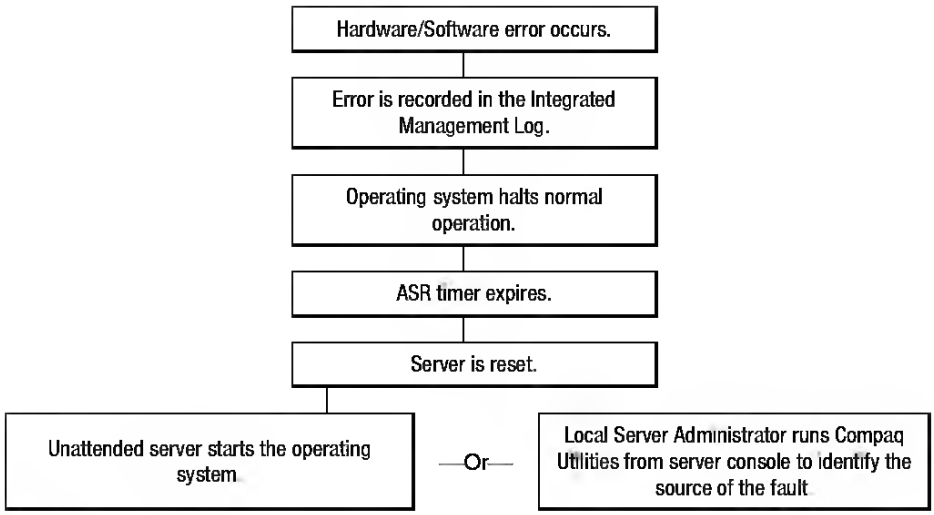
Hardware/Software error occurs.
Error is recorded in the Integrated Management Log.
Operating system halts normal operation.
ASR timer expires.
Server is reset.
Unattended server starts the operating system
—Or—
Local Server Administrator runs Compaq Utilities from server console to identify the source of the fault

Figure 3-1. ASR flowchart

## ASR Security

The standard Compaq password features function differently during ASR than during a typical system startup. During ASR, the system does not prompt for the power-on password. This allows ASR to restart the operating system without user intervention.

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## ASR Integrated Management Log (IML) Messages

The Integrated Management Log (IML) records memory errors, as well as catastrophic hardware and software errors, that cause the system to fail. This information helps you quickly identify and correct the problem, thus minimizing downtime.

You can view the IML through Compaq Insight Manager. The Diagnostics Utility either resolves the error or suggests corrective action in systems that do not support event logs.

The IML identifies and records all the errors in Table 3-22.

**Table 3-22**
**ASR IML Messages**

| Message | Description |
|---|---|
| Abnormal Program Termination | The operating system encountered an abnormal situation that has caused a system failure. |
| ASR detected by ROM | An ASR activity was detected and logged by the system ROM. |
| ASR Test Event | The BIOS Setup Utility generated a test alert. |
| Automatic Server Recovery Base Memory Parity Error | The system detected a data error in base memory following a reset due to the ASR timer expiration. |
| Automatic Server Recovery Memory Parity Error | Corrupt system memory caused the operating system to stop responding. Run Diagnostics to identify the failed memory module. |
| Battery Failing | This message is a low system battery warning. Replace battery within seven days to prevent loss of nonvolatile configuration memory. Failure of the battery supporting the system nonvolatile RAM is imminent. |
| Caution: Temperature Exceeded | The operating system detected that the temperature of the system exceeded the caution level. Accompanying data in the log notes if an auto-shutdown sequence has been invoked by the operating system. |
| Diagnostic Error | An error was detected by the Diagnostics Utility. See the specific error code in this chapter for a detailed explanation. |
| Error Detected On Boot Up | The server detected an error during the(POST). |
| Processor Prefailure | A CPU has passed an internal corrected error threshold, incurring excessive internal ECC cache errors. |
| NMI – PCI Bus Parity Error | A parity error was detected on the PCI bus. |
| NMI – Expansion Board Error | A board on the expansion bus indicated an error condition, resulting in a server failure. |
| NMI – Expansion Bus Master Time-Out | A bus master expansion board in the indicated slot did not release the bus after its maximum time, resulting in a server failure. |
| NMI – Expansion Bus Slave Time-Out | A board on the expansion bus delayed a bus cycle beyond the maximum time, resulting in a server failure. |

*continued*

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**Table 3-22**
**ASR IML Messages** *continued*

| Message | Description |
|---|---|
| NMI – Fail-Safe Timer Expiration | Software was unable to reset the system fail-safe timer, resulting in a server failure. |
| Processor Exception | The indicated processor exception occurred. |
| NMI – Processor Parity Error | The processor detected a data error, resulting in a server failure. |
| NMI – Software Generated Interrupt Detected Error | Software indicated a system error, resulting in a server failure. |
| Caution: Temperature Exceeded | The operating system detected that the temperature of the system exceeded the caution level. Accompanying data in the log notes whether an auto-shutdown sequence has been invoked by the operating system. |
| Abnormal Program Termination | The operating system encountered an abnormal situation that caused a system failure. |
| ASR Test Event | A test program caused ASR. |
| NMI – Automatic Server Recovery Timer Expiration | The operating system received notice of an impending ASR timer expiration. |
| Required System Fan Failure | The required system fan failed. Accompanying data in the log notes if an auto-shutdown sequence was invoked by the operating system. |
| UPS A/C Line Failure Shutdown or Battery Low | The UPS notified the operating system that the AC power line failed. Accompanying data indicates if an auto-shutdown sequence was invoked or the battery was nearly depleted. |
| ASR detected by ROM | An ASR activity was detected and logged by the system ROM. |

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### Storage Fault Recovery Tracking

This feature tracks over 12 failure-indication parameters sucb as timeouts, spin-up, and self-test errors of SCSI drives. You can use these parameters to pinpoint failed storage subsystem components and to recover from a controller or hard drive failure.

### Storage Automatic Reconstruction

This feature automatically reconstructs data to an online spare or to a replaced drive if a drive fails. To use the reconstruction feature, you must configure the server for drive mirroring or data guarding. The reconstruction decreases system downtime by allowing rapid recovery to full system operation if a drive fails.

### Network Interface Fault Recovery Tracking

This feature tracks over 20 failure-indication parameters such as alignment errors, lost frames, and frame copy errors of Ethernet and Token-Ring network interfaces. Fault recovery tracking decreases network downtime by enabling diagnosis of actual network interface failures.

### Memory Fault Recovery Tracking

This feature inspects the operation of the memory subsystem by looking for uncorrectable memory errors.

## ROMPaq Error Recovery Options

From time to time it may be desirable to upgrade the current system ROM. Some reasons for this upgrade may be as follows:

- Customer desires ROM upgrade
- Obtained new SmartStart CD-ROM
- Desire to upgrade server processors
- Request from Compaq

The process of upgrading the system ROM is referred to as flashing tbe ROM. Flashing consists of using software to replace the current ROM image with a new one through ROMPaq.

If an error sucb as a power failure occurs during this process, the flasb operation does not complete, causing the ROM image in the server to corrupt. Compaq provides two options for ROMPaq recovery, depending on the server and circumstances involved.

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## ROMPaq Disaster Recovery

The following option should be utilized by any server that does not have a valid ROM image.

1. Build a fresh ROMPaq diskette, using the latest version for the server involved.
2. Power down the server.
3. Set configuration switch SW1.4 on the system maintenance switch block to On to enable disaster mode.

**Table 3-23**
**System Board SW1 Configuration Switches**

| Switch | Function | Default |
|---|---|---|
| 1 | Clear password | Off |
| 2 | Clear configuration | Off |
| 3 | Tower configuration | Off |
| 4 | Enter BIOS disaster recovery mode | Off |

4. Insert the ROMPaq diskette. Although you utilize a normal ROMPaq diskette, the old ROM image is not saved during this process.
5. Power up the server. The keyboard, mouse, and monitor are all inactive.
6. The server generates two long beeps to indicate you are in Disaster Recovery Mode.
7. The server analyzes the diskette for the latest ROM image. If the diskette is not in place, the system continues to beep until a valid ROMPaq diskette is inserted.
8. The ROMPaq diskette flashes the system ROM.
9. A series of increasing tones indicates disaster recovery is complete and successful.
10. A series of decreasing tones indicates disaster recovery has failed.
11. After successful completion of this process, follow these steps:
    a. Power down the server
    b. Restore the System BIOS SW1 Configuration Switch to its normal position.
    c. Power up the server as usual.

    -Or-

    After a failed ROMPaq upgrade procedure, power down the server and repeat the above process.

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# Compaq Insight Manager

Compaq Insight Manager is a comprehensive management tool to monitor and control the operation of Compaq servers and clients. Compaq Insight Manager delivers intelligent monitoring and alerting as well as visual control of the servers.

In Compaq servers, every hardware subsystem, such as disk storage, system memory, and system processor, has a robust set of management capabilities. Compaq Full-Spectrum Fault Management prevents faults before they happen, keeps the system up and running in the unlikely event of a failure, and delivers rapid server recovery to normal operation after a fault.

## Compaq Insight Management Software Features

Compaq Insight Management software features include:

- **Web browser access**—to Insight Manager Device and Configuration information from anywhere you have network access and a standard Web browser for Windows NT and NetWare servers.
- **Comprehensive fault management**—for all major subsystems, including prefailure alerts in advance of potential system failures.
- **Broad configuration management**—provides effective deployment and maintenance of consistent, manageable configurations with Insight Version Control and Integration Server Maintenance. Version Control and Integration Server Maintenance allow the administrator to monitor and update versions of the server and workstation firmware, drivers, and utilities.
- **Performance management**—sets performance and capacity thresholds for management variables related to CPU and bus utilization, NIC throughput, logical disk capacity, and more.
- **Workstation management**—monitors and manages Compaq Professional Workstations.
- **Client management**—manages faults and assets on Compaq Deskpro computers.
- **Netelligent management**—receives alarms from Netelligent devices. Full management of Netelligent devices is supported through integration with Compaq Netelligent Management Software.
- **Asset management**—exports asset information from the Compaq Insight Manager database to leading database and spreadsheet applications.
- **Remote management**—manages in-band or out-of-band devices, online or offline, from any location.
- **Integration with enterprise management platforms**—provides integration with leading management platforms including HP OpenView, IBM NetView, SunNet Manager, and Microsoft Systems Management Server.
- **Full integration with Compaq Remote Insight Board/PCI**—allows in-band and out-of-band connection for server management to ensure that customers are in touch with their systems, even when they are offline or without power.

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- **Simple Network Management Protocol (SNMP) standards**—allow integration with other management products.
- **Flexible network conductivity**—supports multiple transport protocols including IPX, TCP/IP, and PPP to operator over LANs, WANs, and modems.
- **Support for these operating systems**:
  - Microsoft Windows NT
  - Novell NetWare, Novell intraNetWare, and Compaq intranetWare for Small Businesses
  - SCO UNIX, OpenServer, and UnixWare
- **Reporting**—using Automatic Data Collection, gathers historic performance information for graphing or export purposes.

## Compaq Insight Management Software Architecture

The Compaq Insight Management software architecture is typical of other network management solutions. It has a client/server architecture and is composed of agent software (Compaq Insight Management Agents) and the management application software (Compaq Insight Manager).

### Insight Management Agents

Insight Management Agents operate on Compaq systems (such as servers and workstations), performing in-depth monitoring of the state of the system by collecting and measuring system parameters. These parameters indicate the current state of subsystems by counting the occurrence of particular events (for example, the number of read operations performed on a disk drive) or monitoring the state of a critical function (such as whether the cooling fan is operating).

Insight Desktop Agents operate on Compaq Deskpro computers, monitoring functions that include temperature sensing and disk prefailure alerting.

Insight Management Agents provide information to management applications, such as Compaq Insight Manager, and can generate alarm notifications if significant changes occur in the fault or performance aspects of system operation. Information is delivered to and from the Insight Management Agents by the industry-standard Simple Network Management Protocol (SNMP).

### Compaq Insight Manager

Compaq Insight Manager delivers intelligent monitoring and alerting as well as visual control of the Compaq hardware. In the unlikely event of hardware failures, Compaq Insight Manager also provides a full complement of remote maintenance and control facilities.

For additional information, refer to the online *Compaq Insight Manager User Guide* on the server documentation CD that accompanied the server.

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Chapter 4

# Connectors, Switches, and LED Indicators

## Connectors

This section contains graphics and tables identifying connector locations on the system board, rear panel, and Server Feature Board for the Compaq ProLiant ML330.

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## System Board Components

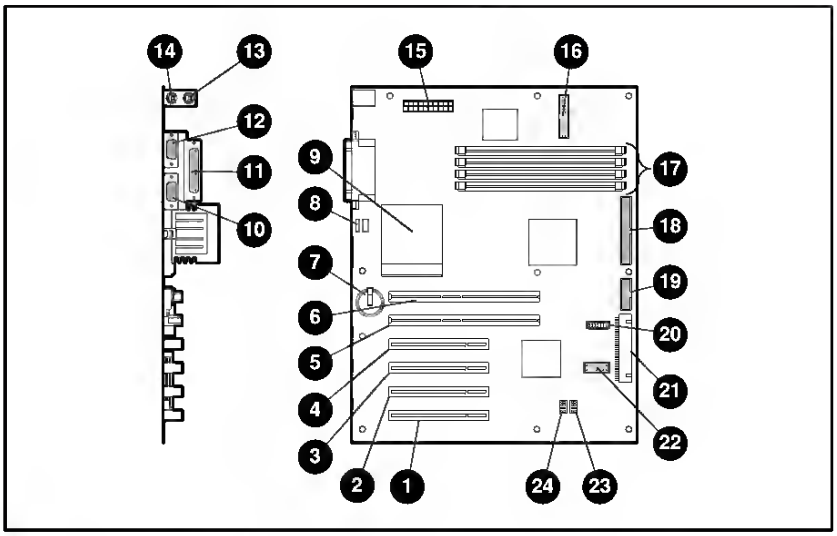


Figure 4-1. System board components

**Table 4-1**
**System Board Components**

| Item | Description | Item | Description |
|---|---|---|---|
| ❶ | 32-bit PCI slot 6 | ⓭ | Mouse connector |
| ❷ | 32-bit PCI slot 5 | ⓮ | Keyboard connector |
| ❸ | 32-bit PCI slot 4 | ⓯ | Power supply connector |
| ❹ | 32-bit PCI slot 3 (Server Feature Board) | ⓰ | Diskette drive connector |
| ❺ | 64-bit PCI slot 2 | ⓱ | DIMM slots (four) |
| ❻ | 64-bit PCI slot 1 (half-length) | ⓲ | Primary IDE connector |
| ❼ | Battery | ⓳ | Power switch connector |
| ❽ | System fan connector | ⓴ | Server Management Information Connector (SMIC) |
| ❾ | Processor | ㉑ | Secondary IDE connector |
| ❿ | Serial port connector B | ㉒ | Remote Insight Board connector |
| ⓫ | Parallel port connector | ㉓ | System configuration switch (SW2) |
| ⓬ | Serial port connector A | ㉔ | Processor speed switch (SW1) |

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## Rear Panel Connectors

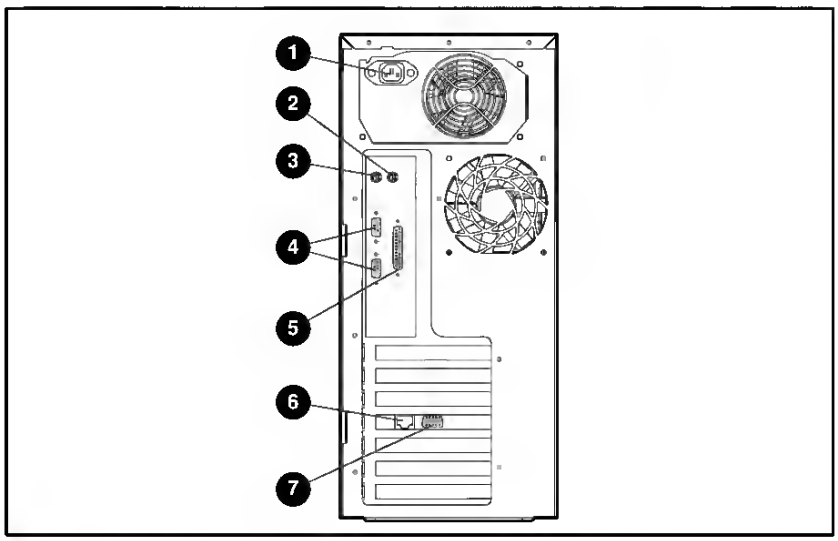


Figure 4-2. Rear panel connectors

**Table 4-2**
**Rear Panel Connectors**

| Item | Connector | Item | Connector |
|---|---|---|---|
| ❶ | Power cord | ❺ | Parallel port |
| ❷ | Mouse | ❻ | RJ-45 Ethernet for NIC |
| ❸ | Keyboard | ❼ | Video |
| ❹ | Serial ports | | |

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## Server Feature Board Components

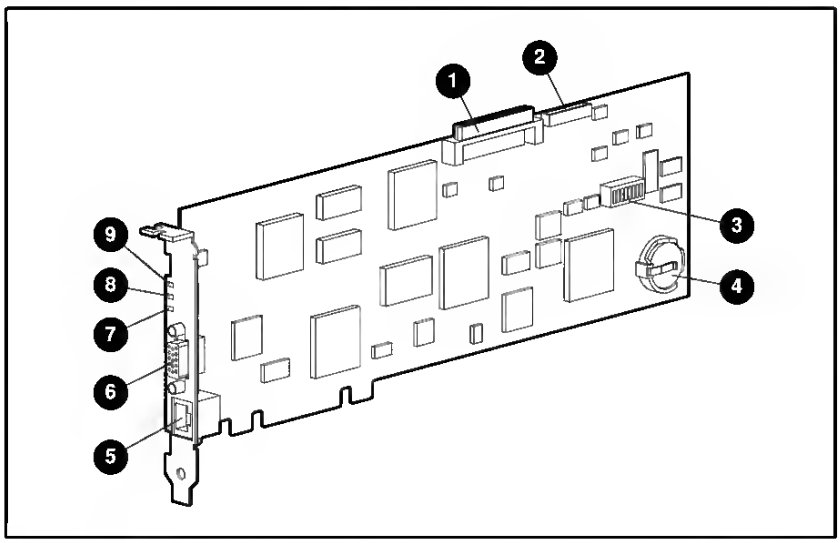


Figure 4-3. Server Feature Board components

**Table 4-3**
**Server Feature Board Components**

| Item | Component | Item | Component |
|---|---|---|---|
| ❶ | SCSI channel connector | ❻ | Video connector |
| ❷ | Server Management Information Cable (SMIC) connector | ❼ | Network speed indicator |
| ❸ | Server Feature Board configuration switch | ❽ | Network link status indicator |
| ❹ | Replaceable lithium battery (CR2032) | ❾ | Network activity indicator |
| ❺ | RJ-45 Ethernet connector for NIC | | |

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# Switches

This section contains graphics and tables showing switch locations on the ProLiant ML330 system board and Server Feature Board.

## Processor Speed Switch Settings (SW1)

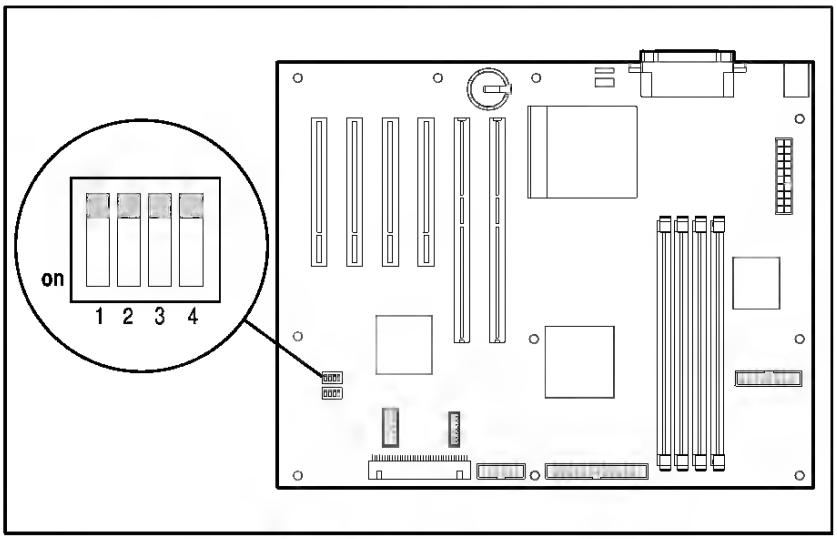


Figure 4-4. Processor speed switch settings (SW1)

**Table 4-4**
**Processor Speed Switch Settings (SW1)**

| Switch | Default | Description |
|---|---|---|
| 1 | The default setting for each position depends on the processor installed. See option kit for processor switch setting. | Reserved |
| 2 | | Reserved |
| 3 | | Reserved |
| 4 | | Reserved |

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## System Configuration Switch Settings (SW2)

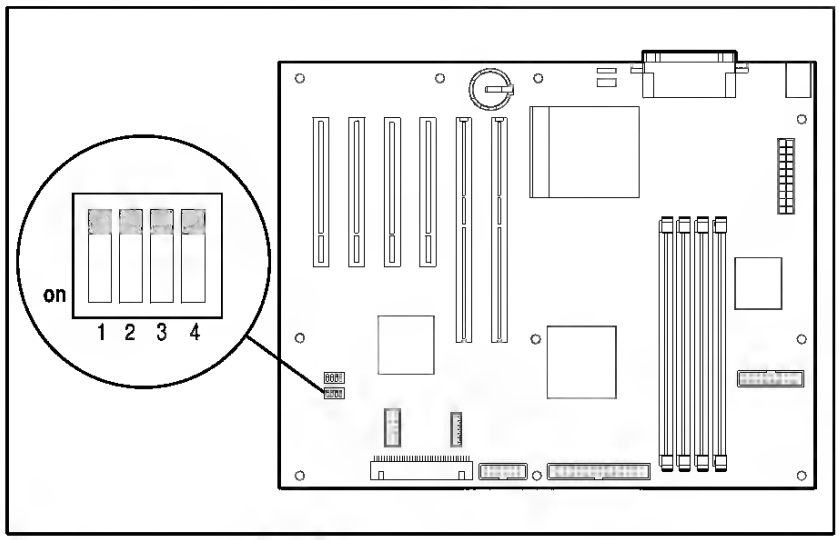


Figure 4-5. System configuration switch settings (SW2)

**Table 4-5**
**System Configuration Switch Settings (SW2)**

| Switch | Function | Default |
|---|---|---|
| 1 | On = Clear setup password | Off |
| 2 | On = Clear stored configuration data | Off |
| 3 | Reserved | Off |
| 4 | Reserved | Off |

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## Server Feature Board Configuration Switch Settings (SW1)

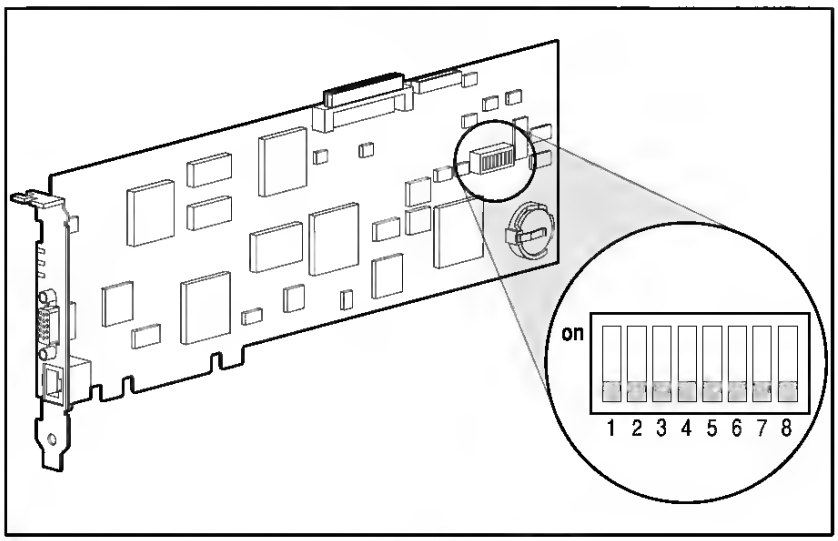


Figure 4-6. Server Feature Board configuration switch settings (SW1)

**Table 4-6**
**Server Feature Board Configuration Switch Settings (SW1)**

| Switch | Function | Default Position |
|---|---|---|
| 1 | On = Disable Video | Off |
| 2 | Reserved | Off |
| 3 | Reserved | Off |
| 4 | Reserved | Off |
| 5 | Reserved | Off |
| 6 | Reserved | Off |
| 7 | Reserved | Off |
| 8 | Reserved | Off |

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# Voltage Regulator Switch

Set the voltage regulator switch ❶ to either 115 volt or 230 volt, as appropriate for your location.

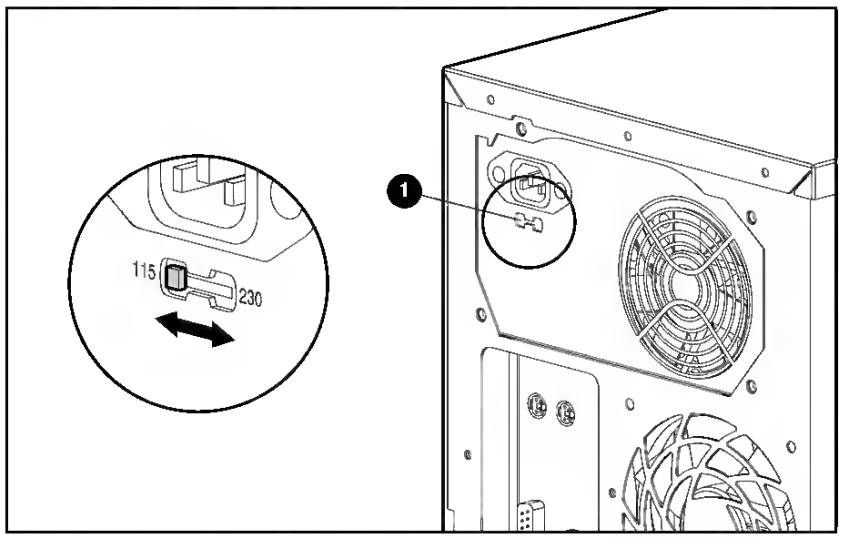


Figure 4-7. Voltage regulator switch location

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# Status Indicators

This section contains graphics information on the following:

- System status LED indicators
- Network controller status LED indicators

## System Status LED Indicators

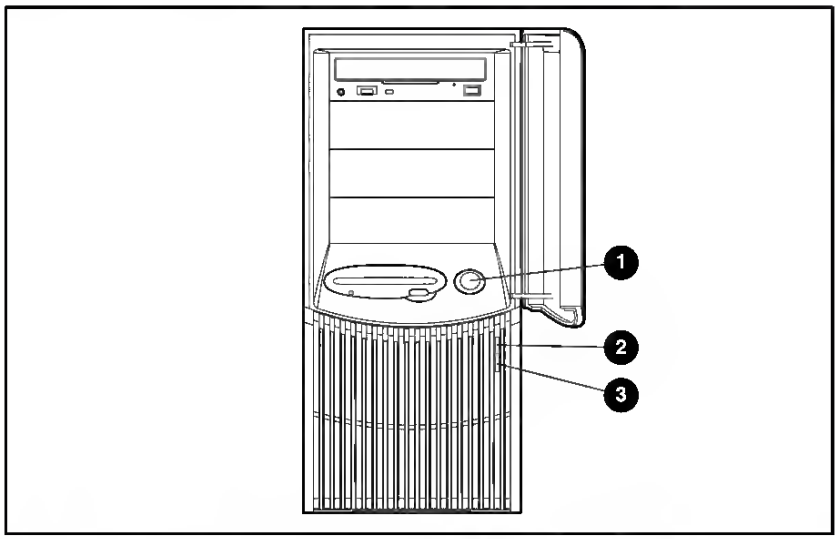


Figure 4-8. System status LED indicators power button ❶, power status LED indicator ❷, and hard drive activity status LED indicator ❸

**Table 4-7**
**System Status LED Indicators**

| LED Indicator | Status | Condition |
|---|---|---|
| ❶ Power button | On | System on. |
| ❷ Power status | On or Off | System on, AC power OK Do not remove power from system. |
| | Off | System off, no AC power. |
| ❸ Hard drive activity status | On or Flashing | Drive being accessed |
| | Off | Drive not being accessed. |

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## Network Controller Status Indicators

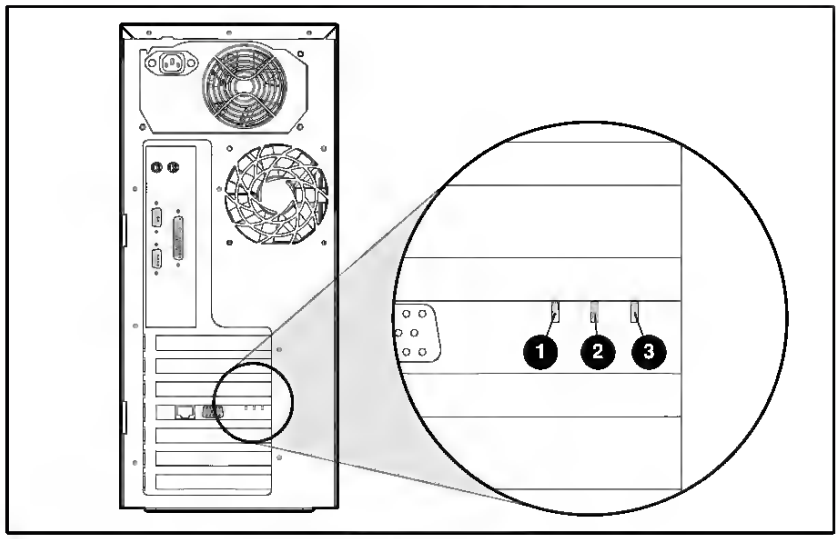


Figure 4-9. Network controller status indicators

**Table 4-8**
**Network Controller Status Indicators**

| Item | Description | Status | Condition |
|---|---|---|---|
| ❶ | Speed | Off | 10Base-T 10-Mb/sec (10Base-T Ethernet) |
| | | On | 100Base-TX 100-Mb/sec (100Base-TX Ethernet) |
| ❷ | Link | Off | No network link |
| | | On | Linked to network |
| ❸ | Activity | Off | No network activity |
| | | On or Flashing | Network activity |

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Chapter 5

# Physical and Operating Specifications

This chapter provides specifications for the Compaq ProLiant ML330. The following specifications are provided:

- System Unit
- Memory
- 1.44-MB Diskette Drive
- IDE CD-ROM Drive
- Wide Ultra2 SCSI Hard Drives
- Integrated 10/100 Wake on LAN NIC
- Integrated Single Channel Wide Ultra2 SCSI Controller

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# System Unit

**Table 5-1**
**System Unit Specifications**

| | |
|---|---|
| Dimensions | |
| Height | 42.86 mm (16.875 inch) |
| Width | 19.05 mm (7.5 inch) |
| Depth | 50.8 mm (20 inch) |
| Weight | 10.1 kg (26 lb) weight approximate, depending upon options |
| International input requirements | |
| Rated input voltage | 180-264 VAC |
| Rated input frequency | 50-60 Hz |
| Rated input current | 3 A |
| U.S. input requirements | |
| Rated input voltage | 90-132 VAC |
| Rated input frequency | 50-60 Hz |
| Rated input current | 6 A |
| Power supply output power | |
| Rated steady state power | 250W |
| BTUs for tower model | 1560 |
| Temperature range | |
| Operating | 50° to 93°F/ 10° to 35°C |
| Nonoperating | -22° to 140°F/ -30° to 60°C |
| Relative humidity (noncondensing) | |
| Operating | 20% to 80% |
| Nonoperating | 5% to 90% |
| Acoustic noise | |
| Idle (hard drives spinning) | 6 NPEL (BELS)/43 AVERAGE SPL (dba) |
| Operating (random seeks to hard drives) | 6.1 NPEL (BELS)/44 AVERAGE SPL (dba) |

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# Memory

**Table 5-2**
**ECC SDRAM Specifications**

| | |
|---|---|
| Size | 64, 128, 256, and 512 MB |
| Speed | PC 133 MHz |
| Type | Registered ECC SDRAM DIMMs |

# 1.44-MB Diskette Drive

**Table 5-3**
**1.44-MB Diskette Drive**

| | |
|---|---|
| Size | 8.89 mm (3.5 inch) |
| LED indicators (front panel) | Green |
| Read/write capacity per diskette (high/low density) | 1.44 MB/720 KB |
| Drives supported | 1 |
| Drive height | Third, 1 inch |
| Drive rotation | 300 rpm |
| Transfer rate bits/sec (high/low) | 500 K/250 K |
| Bytes/sector | 512 |
| Sectors per rack (high/low) | 18/9 |
| Tracks per side (high/low) | 80/80 |
| Access times | |
| Track-to-track (high/low) | 3 ms/6 ms |
| Average (high/low) | 169/94 ms |
| Settling time | 15 ms |
| Latency average | 100 ms |
| Cylinders (high/low) | 80/80 |
| Read/write heads | 2 |

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# IDE CD-ROM Drive

**Table 5-4**
**IDE CD-ROM Specifications**

| | |
|---|---|
| Applicable disk | CD-ROM (modes 1 and 2); mixed mode (audio and data combined); CD-DA; Photo CD (single- and multiple-session), CD-XA (mode 2, forms 1 and 2); CDI ready; CD-WO |
| Capacity | 650 MB |
| Rotational speed | 5200 rpm |
| Block size | 2328 bytes (CD-XA) |
| | 2340, 2336, 1024 bytes (mode 2) |
| | 2048, 1024 bytes (mode 1) |
| | 2352 bytes (CD-DA) |
| Dimensions | |
| Height | 42.9 mm (1.69 inch) |
| Width | 208.0 mm (8.2 inch) |
| Depth | 150.1 mm (5.91 inch) |
| Weight | 0.950 kg (2.09 lb) |
| Data transfer rate | |
| Sustained | 150 KB/s (single), 1500-6000 KB/s (10X to 40X) |
| Burst | 150 to 6000 KB/s |
| Interface | IDE (ATAPI) |
| Access times (typical) | |
| Full stroke | <150 ms |
| Random | <100 ms |
| Diameter | 12 cm, 8 cm (4.7 inch, 3.15 inch) |
| Center hole | 15 mm (0.6 inch) |
| Thickness | 1.2 mm (0.05 inch) |
| Track pitch | 1.6 µm |
| Cache/buffer | 128 KB |
| Startup time | <7 seconds |
| Stop time | <4 seconds |

*continued*

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**Table 5-4**
**IDE CD-ROM Specifications** *continued*

| | |
|---|---|
| Laser parameters | |
| Type | Semiconductor Laser GaA1As |
| Wave length | 780 +/- 25 nm |
| Divergence angle | 53.5° +/- 1.5° |
| Output power | 0.14 mW |
| Operating conditions | |
| Temperature | 5° to 45°C (41° to 113°F) |
| Humidity | 5% to 90% (10% to 80%) |

# Wide Ultra2 SCSI Hard Drives

**Table 5-5**
**Wide Ultra2 SCSI Hard Drives**

| | 9.1 GB 7.2 K | 9.1 GB 10 K |
|---|---|---|
| Capacity | 9100.0 MB | 9100.0 MB |
| Height | 25.4 mm (1 inch) | 25.4 mm (1 inch) |
| Width | 88.9 mm (3.5 inch) | 88.9 mm (3.5 inch) |
| Interface | Wide Ultra2 SCSI | Wide Ultra2 SCSI |
| Transfer rate synchronous (max) | 80 MB/s | 80 MB/s |
| Seek time (typical, including setting) | | |
| Single track | 1.9 ms | 0.8 ms |
| Average | 7.5 ms | 5.4 ms |
| Full stroke | 15.0 ms | 12.2 ms |
| Rotational speed | 7,200 rpm | 10,000 rpm |
| Physical configuration | | |
| Bytes/sector | 512 | 512 |
| Logical blocks | 17,773,524 | 17,773,524 |
| Operating temperature | | |
| Celsius | 10° to 35° | 10° to 35° |
| Fahrenheit | 59° to 95° | 59° to 95° |

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# Integrated 10/100 Wake on LAN Network Interface Controller (NIC)

**Table 5-6**
**Integrated 10/100 Wake on LAN NIC**

| | |
|---|---|
| Network interface | 10Base-T/100Base-TX |
| Compatibility | IEEE 802.2, 802.3, 802.3u |
| Data transfer method | 32-bit, PC 33-MHz bus master |
| Network transfer rate | 10/100 Mbits per second |
| Connector | RJ-45 |
| I/O address and interrupt | Plug and Play PCI |
| Compliance | PCI 2.2 and 2.1 |
| OS support | Microsoft Windows NT 4.0, Novell NetWare 5.x Server, Novell NetWare 4.x Server, Novell NetWare 3.x Server, SCO UnixWare 7.x, SCO OpenServer 5.0.5, Red Hat Linux 6.1 |

# Integrated Single Channel Wide Ultra2 SCSI Controller

**Table 5-7**
**Integrated Single Channel Wide Ultra2 SCSI Controller**

| | |
|---|---|
| Protocol | Wide Ultra2 SCSI |
| Compatibility | All PCI server configurations are backward compatible with Wide Ultra2 SCSI devices |
| Drives supported | Up to 7 SCSI devices per channel |
| Data transfer method | 32-bit PCI bus-master |
| Maximum transfer rate per PCI Bus (peak) | 133 MB/s |
| SCSI channel transfer rate | 80 MB/s per channel |
| SCSI termination | Active termination |
| SCSI connectors | 1 internal |

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# Index

## Symbols and Numbers

100MHz memory incompatible 3-14

## A

access panel
  part number 1-3
  removing 2-6
  removing, illustrated 2-6
  replacing 2-6
access times
  CD-ROM drive 5-4
  diskette drive 5-3
activity indicators, identified 4-9
ADU
  accessing 3-4
  caution 3-46
  description 3-3, 3-46
  diagnostic messages 3-47
  locating 2-1
  starting 3-46
Array Configuration Utility (ACU) 3-4
array controller POST messages 3-22
Array Diagnostic Utility *See* ADU
ASR
  features 3-62
  flowchart 3-63
  Integrated Management Log (IML) messages 3-64
  security 3-63
  software error recovery 3-62
  thermal shutdown 3-62
  unattended recovery 3-62
  UPS sbutdown 3-62
ASR IML log messages *See* error log messages
ASR-2 timer failure 3-8
Asset Management, defined 3-68
Automatic Data Collection, defined 3-69
Automatic Server Recovery *See* ASR
automatic storage reconstruction, defined 3-66

## B

battery
  function of 2-27
  locating 2-28, 2-29
  low power error 3-17
  part number 1-5
  POST messages 3-17, 3-22, 3-31
  removing, illustrated 2-28, 2-29
  replacing 2-27, 2-29
bezel blank
  part number 1-3
  removing 2-8
  removing, illustrated 2-8
  replacing 2-8
BIOS Setup Utility
  accessing 3-5
  selecting Diagnostics from 3-33
bootstrap processor 3-15
broad configuration management, defined 3-68

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## C


cable clips, part number 1-3
cable routing diagrams
  CD-ROM drive 2-16
  Server Management Information Cable (SMIC) 2-16
  Wide Ultra2 SCSI, integrated 2-17
Cache Accelerators
  initialization failed 3-11
  not installed 3-11
cautions
  access panel, removing 2-6
  ADU 3-46
  controller firmware upgrade 3-46
  data loss 3-4
  defined vii
  electrostatic damage 2-4, 2-18
  electrostatic discharge 2-27, 2-29
  Erase Utility 3-4
  firmware upgrade 3-46
  front bezel, removing 2-5
  grounding viii
  overheating viii
  power fluctuations 2-4
  ventilation clearances viii
CD-ROM drive
  cable routing diagram 2-16
  part number 1-5
  specifications 5-4
  test error codes 3-44
chassis, part number 1-3
clamps, part number 1-3
Client Management, defined 3-68
CMOS, POST messages 3-15
COM port address assignment conflict 3-16
Compaq download facility, telephone number ix
Compaq Insight Management
  features 3-68
  software architecture 3-69
  software features 3-68
Compaq Insight Manager
  defined 3-57, 3-69
  description 3-2
  remote maintenance 3-69
  viewing the event list 3-58
Compaq Survey Utility
  description 3-2
  installing 3-2
  viewing 3-58
Compaq System Reference Library 3-61
compartment, hard drive
  part number 1-3
  removing 2-10
  removing, illustrated 2-11
  replacing 2-11
comprehensive fault management, defined 3-68
configuration
  nonvolatile memory invalid 3-8
  not complete 3-9
configuration/slot mismatch
  device found 3-9
  device not found 3-9
controller POST messages 3-30
Correctable Memory Logs *See* IML
country kit, part number 1-6
CPU fan *See also* fan
  controller not responding 3-18
  failure detected 3-17
Critical Error Log messages *See* error log messages


## D


data transfer rate
  32-Bit Dual Channel Wide Ultra2 SCSI Adapter 5-6
  diskette drive 5-3
  hard drive 5-5
DC-DC converter POST messages 3-10
Diagnose Drive Array utility, accessing 3-33


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Diagnostics
accessing 3-2, 3-4
defined 3-33
description 3-2
diskette, creating 3-33
drive array 3-33
error codes 3-33
locating 2-1, 3-2
overview 3-2
running 3-33
test error codes
CD-ROM drive 3-44
diskette drive 3-38
hard drive 3-41, 3-44
keyboard 3-36
memory 3-35
modem 3-40
monochrome video board 3-39
pointing device interface 3-45
processor 3-34
SCSI hard drive 3-44
SCSI tape drive 3-45
SCSI/IDE CD-ROM drive 3-44
serial port 3-39
tables, described 3-33
tape drive 3-42, 3-45
VGA board 3-42
video display unit 3-37
DIMMs *See* memory
disk 0 failure 3-26
disk 1 failure 3-26
disk controller failure 3-26
diskette drives
access times 5-3
cable assembly part number 1-6
part number 1-5
POST messages 3-13
specifications 5-3
test error codes 3-38
diskette, creating Diagnostics 3-33
drive array
array accelerator
configuration error 3-31
not responding 3-31
read error occurred 3-32
write error occurred 3-32
array accelerator battery
charge low 3-31
depleted - data lost 3-31
diagnosing 3-33
drive(s) disabled 3-32
errors 3-22, 3-23, 3-24, 3-26, 3-29, 3-32
operating in interim recovery mode 3-29
POST messages 3-22, 3-23, 3-24, 3-26, 3-29, 3-30, 3-32
replacement drive detected 3-26
reports 3-30
resuming automatic data, recovery process 3-26
drive tray
part number 1-3
removing 2-9
removing, illustrated 2-9
replacing 2-9
drivers, installing 3-3

## E

electrostatic discharge See ESD
enhanced keyboard *See* keyboard
environmental recovery 3-62
error codes *See also* test error codes
100 through 199 3-34
1100 through 1199 3-39
1200 through 1299 3-40
1700 through 1799 3-41
1900 through 1999 3-42
200 through 299 3-35
2400 through 2499 3-42
300 through 399 3-36
400 through 499 3-36
500 through 599 3-37
600 through 699 3-38
6500 through 6599 3-44
6600 through 6699 3-44
6700 through 6799 3-45
800 through 899 3-39
8600 through 8699 3-45
description 3-33

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error condition, resolving 3-33
error log messages
Abnormal Program Termination 3-64, 3-65
ASR
Base Memory Parity Error 3-64
detected by ROM 3-64, 3-65
Test Event 3-64
Battery Failing 3-64
Boot Up 3-64
Caution, Temperature Exceeded 3-64, 3-65
Diagnostic Error 3-64
NMI
Automatic Server Recovery Timer Expiration 3-65
Expansion Board Error 3-64
Expansion Bus Master Time-Out 3-64
Fail-Safe Timer Expiration 3-65
PCI Bus Parity Error 3-64
Processor Parity Error 3-65
Software Generated Interrupt Detected Error 3-65
Processor Exception 3-65
Processor Prefailure 3-64
Required System Fan Failure 3-65
UPS A/C Line Failure Shutdown or Battery Low 3-65
error messages
accelerator 3-47, 3-48, 3-54, 3-56
adapter/NVRAM ID 3-49
array accelerator battery pack 3-49
batteries 3-52
board in use by expand operation 3-49
configuration signature 3-49
controller 3-49, 3-50, 3-54
disable command 3-50
drive 3-51
drive (bay) *X* 3-50, 3-51, 3-52
drive monitoring 3-51
drive write cache 3-56
error occurred reading RIS copy 3-52
identify controller data 3-52
identify logical drive data 3-52
insufficient adapter resources 3-52
logical drive *X* 3-52, 3-53
loose cable detected 3-54
mirror data 3-54
RIS 3-54
SCSI Port *X* Drive ID *X* 3-54, 3-55
set configuration command 3-55
soft firmware upgrade required 3-55
unable to communicate with drive 3-55
unknown disable code 3-56
unrecoverable read error 3-56
warning bit detected 3-56
write error 3-51
write memory error 3-56
errors
battery 3-17
drive array 3-24, 3-26, 3-29, 3-30, 3-32
fixed disk 3-21
microcode patch 3-32
ESD
preventing 2-2
tool recommendations 2-2
work area recommendations 2-2
Event List
printing 3-58
viewing 3-58
event messages, defined 3-59
event type
ASR system lockup 3-61
fan failure 3-59
machine environment
fan 3-59
overheat condition 3-59
main memory
Correctable Error threshold exceeded 3-59
Uncorrectable Error 3-59
operating system, automatic OS sbutdown 3-61
PCI bus error 3-60

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power subsystem
power AC overload 3-60
power module failure 3-60
power modules not redundant 3-60
power supply failure 3-60
power supply inserted 3-60
power supply not redundant 3-60
power supply removed 3-60
system configuration battery low 3-60
processor
Correctable Error Threshold exceeded 3-60
Host Bus Error 3-60
Uncorrectable Error 3-60
events log
description 3-3
viewing 3-3
expansion board guide
part number 1-3
removing 2-24
removing, illustrated 2-24
replacing 2-24
expansion board knockout, part number 1-3
expansion slots
identified 2-22
illustrated 2-22


## F


fan
failure detected 3-17
part number 1-5
POST messages 3-6, 3-17, 3-18
removing 2-15
removing, illustrated 2-15
replacing 2-15
fan controller not responding 3-18
FATAL ROM ERROR, system ROM 3-7
fixed disk 0
does not support block mode 3-22
does not support DMA mode 3-21
failed identify command 3-21
failed set block mode command 3-21
fixed disk 1
does not support block mode 3-22
does not support DMA mode 3-21
failed identify command 3-21
failed set block mode command 3-21
fixed disk errors 3-21
flexible network conductivity, defined 3-69
floppy drive *See* diskette drive
front bezel
part number 1-3
removing 2-5
removing, illustrated 2-5
replacing 2-5


## G


grounding techniques 2-2


## H


hard drive
part number 1-5
POST messages 3-20, 3-21
removing 2-12
removing, illustrated 2-12
replacing 2-12
specifications 5-5
test error codes 3-41, 3-44
hard drive compartment
part number 1-3
removing 2-10, 2-11
removing, illustrated 2-11
replacing 2-11
hardware kit, part number 1-3
help
additional sources ix
Compaq website ix
technical support, telephone numbers ix
hood panel, part number 1-3
http://www.compaq.com ix


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## I


I/O fan *See also* fan
  controller not responding 3-18
  failure, detected 3-17
I/O ROM error 3-8
icons on equipment 2-3
IDE CD-ROM drive *See* CD-ROM drive
IDE ribbon cable assembly, part number 1-6
illustrated parts map, part number 1-6
illustrations
  access panel, removing 2-6
  battery, removing 2-28, 2-29
  bezel blank, removing 2-8
  CD-ROM drive cable, removing 2-16
  drive bay descriptions 2-7
  drive tray, removing 2-9
  expansion board guide, removing 2-24
  expansion slots 2-22
  fan, removing 2-15
  front bezel, removing 2-5
  hard drive compartment, removing 2-11
  hard drive compartment, removing cables 2-10
  hard drive, removing 2-12
  Integrated Wide Ultra2 SCSI cable, locating 2-17
  LEDs, removing 2-14
  mechanical parts, exploded view 1-2
  memory module 2-21
  memory module slot locations 2-20
  network controller status indicators 4-10
  power and hard drive activity indicators 4-9
  power button indicator 4-9
  power supply, removing 2-26
  power switch, removing 2-13, 2-14
  processor fan, unplugging, 2-18
  processor switch location and default settings (SW1) 4-5
  processor with heatsink, removing 2-19
  rear panel components 4-3
  Server Feature Board
    components 4-4
    configuration switch location and default settings 4-7
    removing 2-23
  Server Management Information Cable (SMIC), locating 2-16
  storage drive bay descriptions 2-7
  system board
    components 4-2
    configuration switch location and default settings 4-6
    location 2-25
  system components, exploded view 1-4
  voltage regulator switch location and default settings (SW1) 4-8
IMD, description ix
IML
  accessing 3-57
  defined 3-57, 3-64
  description 3-3
  error types explained 3-64
  messages 3-64
  security levels defined 3-57
  viewing 3-57, 3-58, 3-64
important, defined vii
initialization failure 3-7
Insight Agents, defined 3-69
Insight Management Agents, enabling 3-61
Inspect Computer utility, accessing 3-33
Integrated Management Display (IMD), description ix
Integrated Management Log *See* IML
integrated server management features 3-61
Integrated Smart Array Controller Installation Guide 3-25
internal SCSI jumper board not installed 3-19
intruder alert 3-16
invalid electronic serial number 3-7
invalid memory
  configuration 3-10
  speed 3-10
invalid voltage regulator module installed 3-10


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## K

keyboard
connector, identified 4-2
controller error 3-12
part number 1-6
POST messages 3-11, 3-12
test error codes 3-36

## L

LEDs
illustrated 4-9
network controller status 4-9
removing 2-14
removing, illustrated 2-14
replacing 2-14
system status 4-9
locked SCSI bus detected 3-18
log reinitialized 3-9
low system battery 3-17

## M

maintenance and service guide, part number 1-6
mechanical parts
exploded view 1-2
spare parts list 1-3
memory
address error 3-9
detection failure 3-10
device failure 3-10
errors, recorded to Log 3-64
fault recovery tracking 3-66
invalid configuration error 3-10
invalid speed error 3-10
part number 1-5
POST messages 3-6, 3-7, 3-8, 3-9, 3-10, 3-14
size 5-3
specifications 5-3
speed 5-3
test error codes 3-35
type 5-3
memory module *See also* memory
identified 2-21
removing DIMMs 2-21
replacing 2-21
slot locations, identified 2-20
memory type mismatch 3-9
miscellaneous plastics kit, part number 1-3
modem, test error codes 3-40
monochrome video board, test error codes 3-39

## N

Netelligent Management, defined 3-68
network controller status indicators, illustrated 4-10
network interface fault recovery 3-66
NIC specifications 5-6
nonfunctioning voltage regulator module 3-10
nonsystem disk or disk error 3-7
note, defined vii
NVRAM POST messages 3-15

## O

operating temperature, hard drive 5-5

## P

panel access
part number 1-3
parallel port, address assignment conflict 3-12
parallel printer, test error codes 3-36
parity check 2 3-7
parity error POST messages 3-7
part numbers
access panel 1-3
battery 1-5
cable clips 1-3
CD-ROM drive 1-5
chassis 1-3
clamps 1-3
country kit 1-6
diskette drive 1-5
drive tray 1-3
expansion board guide 1-3
expansion board knockout 1-3
fan grill assembly 1-5
front bezel door 1-3
hard drive 1-5
hood panel 1-3
IDE ribbon cable assembly 1-6
illustrated parts map 1-6
keyboard 1-6
maintenance and service guide 1-6
memory 1-5
miscellaneous plastics kit 1-3
panel access 1-3
power button 1-6

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power cable kit 1-6
power supply 1-5
processor 1-5
processor with heatsink 1-5
removable media bezel blank 1-3
return kit 1-6
rubber bumpers 1-3
SCSI LVD cable kit 1-6
Server Feature Board 1-5
Server Management Information Cable (SMIC) 1-6
signal cable kit 1-6
system board 1-5
parts
handling 2-2
storing 2-2
transporting 2-2
password cleared POST messages 3-15
PCI Hot Plug POST messages 3-18
PCI slots powered down 3-18
performance management, defined 3-68
physical configuration, hard drive 5-5
pointing device interface, test error codes 3-45
POST alert, intruder 3-16
POST messages
100 series 3-8, 3-9
1100 series 3-16
1600 series 3-17, 3-18, 3-19
1700 series 3-19, 3-20, 3-21, 3-22, 3-23, 3-24, 3-25, 3-26, 3-27, 3-28, 3-29, 3-30, 3-31, 3-32
1800 series 3-32
200 series 3-9, 3-10, 3-11
300 series 3-11, 3-12
400 series 3-12
600 series 3-13
800 series 3-13, 3-14, 3-15, 3-16
array controller 3-22
array enabler board 3-19
batteries 3-17, 3-22, 3-31
beeps only 3-6
Cache accelerator RAM 3-11
CMOS cleared 3-15
controllers 3-30
DC-DC converter 3-10
diskette drive 3-13
drive array 3-22
fan 3-6, 3-17, 3-18
fatal ROM error 3-7
hard drives 3-20, 3-21, 3-22
keyboard 3-11, 3-12
memory 3-6, 3-7, 3-8, 3-9, 3-10
memory incompatible 3-14
memory size 3-8
nonnumeric series 3-6, 3-7
NVRAM 3-15
parity errors 3-7
password cleared 3-15
PCI Hot-Plug 3-18
port address conflict error 3-12
power supply 3-17, 3-18
processor board 3-14
Processor Power Module 3-10, 3-11
processor speed 3-14
RAM 3-11
resume 3-7
ROM 3-7, 3-8
Run BIOS Setup Utility 3-8
SCSI bus locked detected 3-19
SCSI cables 3-18, 3-19
SCSI controllers 3-19
serial ports 3-16
Server Feature Board 3-13, 3-14
snoop rules 3-11
tag RAM 3-11
temperature 3-32
terminator board 3-14
unsupported processor 3-15
virtual mode disk operation unsupported 3-19
power and hard drive activity indicators, illustrated 4-9
power button, illustrated 4-9
power button, part number 1-6
power cable kit, part number 1-6
power fault on processor bus 3-11
Power Processor Module *See* PPM
power supply
configuration error 3-18
failure 3-18
part number 1-5
POST messages 3-17, 3-18
removing 2-26
replacing 2-26
power switch
removing 2-13
removing, illustrated 2-13, 2-14
replacing 2-14


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Power-On Self-Test
defining *See also* POST messages
interpreting error messages 3-5
PPM
lost redundancy 3-10
POST messages 3-10, 3-11
preparing for service procedure 2-4
processor
configuration invalid 3-9
missing 3-14
part number 1-5
POST messages 3-8, 3-9
speeds match 3-14
test error codes 3-34
unsupported error message 3-8
processor fan *See also* fan
unplugging, illustrated 2-18
processor speed POST messages 3-14
processor speed switch
location and default settings (SW1), illustrated 4-5
processor with heatsink
part number 1-5
removing 2-18
removing, illustrated 2-19
replacing 2-19

## R

Rapid Recovery Engine, enabling 3-61
rapid recovery services 3-61
rear panel components, illustrated 4-3
recovery
automatic 3-62
environmental 3-62
from software error 3-62
rapid recovery services 3-61
unattended 3-62
redundant ROM
corrupted 3-8
POST messages 3-8
Remote Management, defined 3-68
Remote Utilities, accessing 3-33
removable media bezel blank, part number 1-3
Resume POST message 3-7
return kit, part number 1-6
RJ-45 connector, identifying 2-3
ROM
error 3-8
POST messages 3-7, 3-8
redundant, corrupted 3-8
ROMPaq
Error recovery options 3-66
Firmware Upgrade Utility, accessing 3-4
rubber bumpers, part number 1-3
Run BIOS Setup Utility - F10 key POST message 3-8

## S

SCSI bus, locked 3-19
SCSI cable error detected 3-19
SCSI cable POST messages 3-18, 3-19
SCSI controller failure 3-19
SCSI device
not detected 3-7
POST messages 3-7
SCSI LVD cable kit, part number 1-6
secondary controller or disk failure 3-30
secondary disk port address assignment conflict 3-23
security levels
Caution, defined 3-57
Critical, defined 3-57
Repaired, defined 3-57
Status, defined 3-57
security, ASR 3-63
seek time, hard drive 5-5
serial port
address conflict detected 3-16
POST messages 3-16
test error codes 3-39
Server Feature Board
components
illustrated 4-4
configuration switch location and default settings 4-7
not properly cabled 3-14
part number 1-5
POST messages 3-8, 3-13
removing 2-23
removing, illustrated 2-23
replacing 2-23
slot 3 installation 3-13
unsupported error message 3-8

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Server Management Information (SMIC), cable routing diagram 2-16
server specifications 5-1
setup password cleared 3-15
shock hazard, identifying 2-3
signal cable kit, part number 1-6
simple network management protocol, defined 3-69
slot ID mismatch 3-8
slot *X* drive array
array accelerator memory size change detected 3-20
capacity expansion process temporarily disabled 3-22
controller failure 3-26
critical drive firmware problem detected 3-23
disk consistency initialization in progress 3-21
drive failure 3-26
drive parameter tracking predicts imminent failure 3-20
drive(s) disabled 3-23
new logical drive(s) attachment detected 3-21
not configured 3-27
obsolete data found in array accelerator 3-24
option ROM conflicts with ISA card 3-22
physical drive position change(s) detected 3-20
ProLiant drive storage enclosure problem detected 3-25
ProLiant storage system not responding 3-24
recovery needed 3-28
replacement drive(s) detected OR previously failed drive(s) now operational 3-26
reports incorrect drive replacement 3-29
requires system ROM upgrade 3-22
resuming logical drive expansion process 3-23
S.M.A.R.T. hard drive(s) detect imminent failure 3-19
SCSI bus termination error 3-24
SCSI drive(s) not responding 3-30
SMART SCSI hard drive detects imminent failure 3-20
SmartStart and Support Software CD
contents 3-4
running utilities 3-4
snoop rules SRAM failure 3-11
software error, recovery from 3-62
specifications
CD-ROM drive
access times 5-4
capacity 5-4
data transfer rate 5-4
dimensions 5-4
laser parameters 5-5
operating conditions 5-5
rotational speed 5-4
startup time 5-4
stop time 5-4
weight 5-4
diskette drive
access times 5-3
data transfer rate 5-3
height 5-3
number supported 5-3
read/write heads 5-3
size 5-3
hard drives
capacity 5-5
data transfer rate 5-5
interface type 5-5
physical configuration 5-5
seek time 5-5
temperature 5-5
memory
size 5-3
speed 5-3
type 5-3
NIC
compatibility 5-6
compliance 5-6
connector 5-6
data transfer method 5-6
I/O address and interrupt 5-6
network interface 5-6
network transfer rate 5-6
system unit
depth 5-2
height 5-2
power supply output 5-2
temperature operating range 5-2
voltage input 5-2
weight 5-2
width 5-2

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Wide Ultra2 SCSI
data transfer method 5-6
drives supported 5-6
maximum transfer rate 5-6
protocol 5-6
SCSI termination 5-6
status indictors *See also* LEDs
storage automatic reconstruction, defined 3-66
storage devices, maximum supported 2-7
storage drive bay descriptions, identified 2-7
storage fault recovery tracking, defined 3-66
Survey Utility, viewing 3-58
switch, power
removing 2-13
replacing 2-14
symbols in text vii
symbols on equipment 2-3
system board
configuration switch location and default settings, illustrated 4-6
connections, illustrated 4-2
failure 3-8
location, illustrated 2-25
part number 1-5
removing 2-25
replacing 2-25
system components
exploded view 1-4
spare parts list 1-5, 1-6
system fan *See also* fan
failure detected 3-17
not present 3-17
system halted 3-8, 3-11, 3-14, 3-18
system options not set 3-8
system processor failed/mapped out 3-10
system unit specifications 5-2


## T


tables
1.44-MB Diskette Drive 5-3
ADU Diagnostic Messages 3-47
Advanced VGA Test Error Codes 3-42
ASR Features 3-62
ASR IML Messages 3-64
Diagnostic Tools 3-2
Diskette Drive Test Error Codes 3-38
Drive Bay Descriptions 2-7
ECC SDRAM Specifications 5-3
Event Messages 3-59
Expansion Slots 2-22
Hard Drive Test Error Codes 3-41
IDE CD-ROM Specifications 5-4
Integrated 10/100 Wake-On-LAN NIC 5-6
Integrated Single Channel Wide Ultra2 SCSI Controller 5-6
Keyboard Test Error Codes 3-36
Mechanical Spare Parts List 1-3
Memory Test Error Codes 3-35
Modem Communications Test Error Codes 3-40
network controller status indicators 4-10
Parallel Printer Test Error Codes 3-36
Pointing Device Test Error Codes 3-45
Power and Hard Drive Activity Indicators 4-9
Power button Indicators 4-9
Primary Processor Test Error Codes 3-34
Processor Speed Switch Settings (SW1) 4-5
Rear Panel Connectors 4-3
SCSI Hard Drive Test Error Codes 3-44
SCSI Tape Drive Test Error Codes 3-45
SCSI/IDE CD-ROM Test Error Codes 3-44
Serial Test Error Codes 3-39
Server Feature Board Components 4-4
Server Feature Board Configuration Switch Settings 4-7
System Board Components 4-2
System Board configuration switch settings 4-6
System Components Spare Parts List 1-5
System Unit Specifications 5-2


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Tape Drive Test Error Codes 3-42
Video Board Test Error Codes 3-39
Video Display Unit Test Error Codes 3-37
Wide Ultra2 SCSI Hard Drives 5-5
tag update rules SRAM failure 3-11
tape drive, test error codes 3-42, 3-45
technical support, telephone numbers ix
technician notes viii, 2-4
telephone numbers
Compaq authorized resellers ix
Compaq download facility ix
technical support ix
temperature
alert 3-32
violation detected 3-17
terminator board missing POST messages 3-14
Test Computer utility, accessing 3-33
test error codes
CD-ROM drive 3-44
diskette drive 3-38
hard drive 3-41, 3-44
keyboard 3-36
memory 3-35
modem 3-40
monochrome video board 3-39
parallel printer 3-36
pointing device interface 3-45
processor 3-34
SCSI hard drive 3-44
SCSI tape drive 3-45
SCSI/IDE CD-ROM drive 3-44
serial port 3-39
tape drive 3-42, 3-45
VGA board 3-42
video display unit 3-37
thermal shutdown 3-62
time and date not set 3-8
tools
required for service procedures 2-1
type recommended 2-2


## U


unsupported processor detected 3-8
unsupported processor POST messages 3-15
unsupported Server Feature Board detected 3-8
unsupported virtual mode disk operation 3-19
Upgrade Firmware utility, accessing 3-33
UPS sbutdown threshold 3-62
utilities
ADU
accessing 3-4
caution 3-46
description 3-3, 3-46
diagnostic messages 3-47
locating 2-1
starting 3-46
Array Configuration Utility (ACU) 3-4
Compaq Insight Manager 3-2, 3-68
Compaq Survey Utility, description 3-2
Compaq System Reference Library 3-61
Diagnose Drive Array, accessing 3-33
Diagnostics
accessing 3-4
menu choices 3-33
selecting from BIOS Setup Utility 3-33
IML
accessing 3-57
defined 3-57, 3-64
description 3-3
error types explained 3-64
messages 3-64
security levels defined 3-57
viewing 3-57, 3-58, 3-64
Remote Utilities, accessing 3-33
ROMPaq Firmware Upgrade, accessing 3-4
running from SmartStart and Support Software CD 3-4
Survey, defined 3-58
Test Computer, accessing 3-33
Upgrade Firmware, accessing 3-33


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## V

VGA board, test error codes 3-42
video display unit, test error codes 3-37
voltage regulator switch location and default settings (SW1), illustrated 4-8

## W

warnings
  battery handling 2-27, 2-29
  component level repairs viii, 2-4
  defined vii
  electric shock vii, viii
  equipment damage viii, 2-3
  fire 2-3
  grounding plug viii
  hot surfaces 2-3, 2-4, 2-6
  improper repairs viii, 2-4
  network interface connection 2-3
  overheating 2-4
  personal injury vii, 2-3, 2-4, 2-6
  RJ-45 receptacle 2-3
  sbock hazard 2-3
  voiding warranty viii, 2-4
Wide Ultra2 SCSI
  cable routing diagram 2-17
  data transfer method 5-6
  maximum transfer rate 5-6
  protocol 5-6
  SCSI termination 5-6
work area recommendations 2-2
Workstation Management, defined 3-68
wrist strap, using 2-2

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